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METAL-MINE ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR 1920

BY

WILLIAM W. ADAMS

WASHINGTON
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METAL-MINE ACCIDENTS DURING THE CALENDAR YEAR 1920.

By WILLIAM W. ADAMS.

INTRODUCTION.

Accidents at metal mines in 1920 caused fewer deaths among the workmen than in any year since 1911, the first year for which information for the country as a whole is available. The number of nonfatal injuries disabling the workman for more than one day was less (except 1919) than in any year since 1914.

Mining companies reported 425 fatalities and 32,562 injuries. There were 3,281 operators actually working their mines all or part of the year. They employed 136,583 men who worked 40,361,893 shifts, an average of 296 working days per man employed in and about the mines. Equating the number of employees to its equivalent in full-time or 300-day workers, as a basis for calculating accident rates, there were 3.16 fatalities and 242.02 injuries per 1,000 men employed. For 1919 the corresponding rates were 3.47 killed and 233.60 injured. Thus the fatality rate was even lower than that for 1919 which was the lowest on record. The nonfatal injury rate for 1920 was the third highest during the past decade, being exceeded only by the rates for 1915 and 1916.

The number of men working at all mines (excluding coal) in 1920 represents a net loss of 8,679 employees. There was a reduction of 4,073 employees at copper mines, 1,686 at iron mines, 2,197 at gold and miscellaneous metal mines, and 1,330 at lead, zinc, and fluorspar mines in the Mississippi Valley. The nonmetallic mineral group of mines showed a gain of 607 employees. The smaller number of men employed does not represent a corresponding decrease in work done, however, because the workers were employed for a larger number of days than in 1919. In fact, the iron mines and lead and zinc mines reported an increased number of shifts worked, although the average number of men employed was smaller than in 1919. The reports show that each employee at copper mines averaged 16 more work days in 1920 than in 1919; employees at gold and miscellaneous metal mines gained 12 days per man; at iron mines, 12 days; at lead and zinc mines, 31 days; and nonmetallic mineral mines, 39 days; the net gain for all mines being 17 days per man employed.

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Of the 32,987 accidents during the year, 1.3 per cent were fatal, less than one-tenth of 1 per cent resulted in permanent total disability, 1.4 per cent in permanent partial diasbility, 23.6 per cent in serious but temporary disability lasting more than 14 days (see Table 20 and footnote), and 73.7 per cent in slight injury causing disability of less than 14 days but more than 1 day.

Underground mining operations show 59.6 per cent of the total shifts worked, 78.6 per cent of all fatal accidents, and 76.6 per cent of all injuries. Stripping and open-pit mining worked 13.5 per cent of the total number of shifts and sustained 8.9 per cent of the fatalities and 7.9 per cent of the injuries. Surface shops and yards show 26.9 per cent of the shifts, 12.5 per cent of fatalities, and 15.5 per cent of injuries. It will thus be seen that the ratio of the percentage of fatalities and injuries underground to the percentage of shifts worked underground is 100:130:128; for open pit mines, 100:66:58; and for surface work, 100:46:58.

SCOPE OF STATISTICS.

The tables presented in this publication are based upon reports representing 3,281 mine operators. In nearly all States the reports were received directly from the operating company, but those for Alaska, California, and Utah were furnished by the State mine inspector or by the State industrial commission. The reports from Arizona and Idaho were received by the bureau in cooperation with the State mine inspector for each of those States; the reports were not only from the operators of producing mines but from prospectors and development companies as well. They are voluntary responses to the bureau's request, as there is no Federal law requiring such reports to be rendered. It is believed that the figures published are reasonably complete for the entire metal-mining industry.

The tables in the following pages are arranged so as to represent five divisions of the mining industry as follows:

Copper mines.—This group comprises all of the copper mines and prospects that were reported in operation in the various copper-producing States.

Gold, silver, and miscellaneous metal mines.—This group comprises the gold mines (both lode and placer), silver mines, lead-silver mines, gold-silver mines, the lead and zinc mines other than those in the Mississippi Valley, and the mines working ores of quicksilver, manganese, tungsten, vanadium, chromium, etc. Also, pyrite mines are included, as the cinder is used in some metallurgical works for its iron and copper content, and bauxite mines, because bauxite is the main source of metallic aluminum.

Iron mines.—All of the important iron mines, representing 154 operators, are included in this group.

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Lead and zinc mines (Mississippi Valley).—This group comprises the lead and zinc mines of the Mississippi Valley only.

Nonmetallic mineral mines.—The nonmetallic mineral mines include those producing asbestos, asphaltum, barite, borax, diamond, emery, feldspar, flint, fluorspar, garnet, graphite, gypsum, kaolin, lithia, magnesite, mica, mineral paint, phosphate rock, quartz, salt, soapstone, sulphur, talc, tripoli, and turquois. Coal mines are not included.

ACKNOWLEDGMENTS.

The Bureau of Mines expresses its appreciation to mine operators and State mine officials whose cooperation has made possible an annual statistical study of mine accidents for the United States. Special mention should be made of the assistance rendered by the State mine officials of Alaska, Arizona, California, Idaho, and Utah. The author's acknowledgments are due to Miss Mary Bringhurst and Miss E. V. Walters, of the Bureau of Mines, to the former for assistance in the compilation of the tables presented and to the latter in the checking and verification of figures.

PUBLICATION OF ACCIDENT STATISTICS.

In publishing these statistics the Federal Bureau of Mines has no intent of encroaching on the field covered by the annual or biennial reports of State mine inspectors or mining departments. The bureau hopes, however, that the distribution of this information will help to establish a uniform basis for recording and reporting mine accidents, the number of men employed, and the number of days or hours of work performed. When all mine-accident statistics are thus placed on the same basis, the making of comparisons and the drawing of conclusions will be rendered much easier.

As bearing on the difficulties that attend the compilation of comparable figures, attention is called to these facts: A number of States have no inspectors for metal mines. There is a lack of uniformity in the reports issued by the various States, as the fiscal years are not the same and the mines subject to inspection differ. Moreover, the States are by no means agreed as to what constitutes an injury, and there is indeed considerable lack of uniformity in the definition of the term "fatal accident." Again, compensation laws in most States apply to all mines, but in some they are elective at the option of the operator.

The Bureau of Mines will be glad to receive suggestions, from State inspectors and other persons interested in mining, as to the form in which accident statistics can be presented most effectively and their publication made most useful to the mining industry.

In addition to the statistical report on accidents at metal mines, the bureau issues separate annual reports covering fatal and nonfatal

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accidents at mills and smelters, quarries, and coke ovens, and fatal accidents at coal mines.

CLASSIFICATION OF INJURIES.

Since 1915 the bureau's classifications of serious and slight injuries has been on a 14-day (2-week) basis. Prior to that time an injury was not classified as serious unless it resulted in a loss of time of more than 20 days. Details by States and causes for the year 1920 are given in Tables 19 and 20.

The classification and the number of injuries for each group since 1915 are as follows:

Fatal, serious, and slight injuries, 1915 to 1920.

Injury.	1915	1916	1917	1918	1919	1920
1. Fatal	553	697	852	646	468	425
2. Serious (time lost more than 14 days):						
A. Permanent disability—						
Total[1]	35	44	39	62	7	12
Partial[2]	574	693	666	640	321	345
B. Others	7,242	10,099	10,220	9,066	7,848	7,894
3. Slight (time lost, 1 to 14 days, inclusive)	27,444	37,401	35,361	33,147	23,330	24,311
Total nonfatal injuries	35,295	48,237	46,286	42,915	31,506	32,562

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

ACCIDENT STATISTICS, BY STATES.

A compilation of the accident statistics for all metal mines, by causes and States, is given in Tables 3, 4, and 5. These statistics represent operators who actually worked their mines all or part of the year 1920. Tables 35 to 42, inclusive, give summary data, by States and years, relating to labor, accidents, etc., for the ten-year period 1911 to 1920, inclusive. The fatalities and injuries are further classified to show the causes of the accidents in each group of mines. (Tables 17 and 18.)

CAUSES AND DISTRIBUTION OF ACCIDENTS.

Tables 16, 17, and 34 show the number of deaths and injuries from any one cause in each group of mines and for all the mines combined. Table 18 shows the percentage of fatalities and injuries due to any one cause for the year 1920. At the bottom of Table 17 is given a similar percentage covering the nine-year period 1911 to 1919 for the United States as a unit.

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TABLE 1.—*ALL MINES: Men employed, and number killed and injured, by kinds of mines, during the years ended Dec. 31, 1920 and 1919.*

1920.

Kind of mine.	Active operators.	Men employed.			Average days active.	Days of labor performed.			Number killed.			Number injured. (Time lost, more than 1 day.)			Widows.	Orphans.
		Underground.	Surface.	Total.		Underground.	Surface.	Total.	Underground.	Surface.	Total.	Underground.	Surface.	Total.		
Copper	387	23,671	11,583	35,254	317	7,419,225	3,762,894	11,182,119	107	21	128	9,624	2,423	12,047	46	78
Gold, silver, and miscellaneous metal	2,358	20,077	9,856	29,933	279	5,806,783	2,548,047	8,354,830	100	17	117	4,794	910	5,704	37	56
Iron	154	25,627	20,363	45,990	295	7,483,915	6,090,873	13,574,788	86	20	106	6,734	2,338	9,072	60	130
Lead and zinc (Mississippi Valley)	119	8,861	2,777	11,638	283	2,466,250	833,028	3,299,278	33	3	36	3,223	384	3,607	19	28
Nonmetallic mineral	263	3,149	10,619	13,768	287	888,214	3,062,664	3,950,878	8	30	38	571	1,561	2,132	18	24
Total, 1920	**3,281**	**81,385**	**55,198**	**136,583**	**296**	**24,064,387**	**16,297,506**	**40,361,893**	**334**	**91**	**425**	**24,946**	**7,616**	**32,562**	**180**	**316**

1919.

Copper	410	27,298	12,029	39,327	301	8,162,636	3,693,855	11,856,491	120	20	140	10,002	2,234	12,236	59	109
Gold, silver, and miscellaneous metal	2,430	21,868	10,262	32,130	267	5,887,825	2,689,270	8,577,095	113	13	126	4,656	813	5,469	49	72
Iron	157	28,234	19,442	47,676	283	8,216,645	5,271,968	13,488,613	107	32	139	6,907	2,191	9,098	77	176
Lead and zinc (Mississippi Valley)	141	10,075	2,893	12,968	252	2,528,831	740,405	3,269,226	42	3	45	2,822	363	3,185	27	54
Nonmetallic mineral	245	3,356	9,805	13,161	248	934,811	2,335,114	3,269,925	6	12	18	414	1,104	1,518	9	20
Total, 1919	**3,383**	**90,831**	**54,431**	**145,262**	**279**	**25,730,738**	**14,730,612**	**40,461,350**	**388**	**80**	**468**	**24,801**	**6,705**	**31,506**	**221**	**431**

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TABLE 2.—***ALL MINES:*** *Fatalities and injuries per 1,000 300-day workers employed during the years ended Dec. 31, 1911 to 1920.*

1920.

Kind of mine.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	Total.	Underground.	Surface.	Total.	Underground.	Surface.	Total.
Copper	24,731	12,543	37,274	4.33	1.67	3.43	389.15	193.18	323.20
Gold, silver, and miscellaneous metal	19,356	8,493	27,849	5.17	2.00	4.20	247.68	107.15	204.82
Iron	24,946	20,303	45,249	3.45	.99	2.34	269.94	115.16	200.49
Lead and zinc (Mississippi Valley)	8,221	2,777	10,998	4.01	1.08	3.27	392.04	138.28	327.97
Nonmetallic mineral	2,961	10,209	13,170	2.70	2.94	2.89	192.84	152.90	161.88
Total, 1920	**80,215**	**54,325**	**134,540**	**4.16**	**1.68**	**3.16**	**310.99**	**140.19**	**242.02**

1919.

Copper	27,209	12,313	39,522	4.41	1.62	3.54	367.60	181.43	309.60
Gold, silver, and miscellaneous metal	19,626	8,964	28,590	5.76	1.45	4.41	237.24	90.70	191.29
Iron	27,385	17,573	44,962	3.91	1.82	3.09	252.18	124.68	202.35
Lead and zinc (Mississippi Valley)	8,429	2,468	10,897	4.98	1.22	4.13	334.80	147.08	292.28
Nonmetallic mineral	3,116	7,784	10,900	1.93	1.54	1.65	132.86	141.83	139.27
Total, 1919	**85,769**	**49,102**	**134,871**	**4.52**	**1.63**	**3.47**	**289.16**	**136.55**	**233.60**
Total, 1918	113,441	67,565	181,006	4.52	1.97	3.57	290.61	147.24	237.09
Total, 1917	126,815	65,270	192,085	5.73	1.92	4.44	289.83	146.02	240.97
Total, 1916	125,601	66,854	192,455	4.57	1.84	3.62	306.12	146.41	250.64
Total, 1915	89,821	52,176	141,997	5.02	1.95	3.89	319.85	125.84	248.56
Total, 1914	91,659	50,960	142,619	5.08	1.82	3.92	261.81	122.04	211.87
Total, 1913	121,293	62,300	183,593	4.52	2.17	3.72	210.44	119.52	179.59
Total, 1912	105,153	56,509	161,662	4.96	2.46	4.09	236.42	103.95	190.11
Total, 1911	98,389	57,700	156,089	5.51	2.65	4.45	217.28	90.10	170.27

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TABLE 3.—*ALL MINES: Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number Killed.			Widows.	Orphans.
		Underground.	Surface.	Total.	Underground.	Surface.	Total.		Underground.	Surface.	Total.		
Alabama	23	4,315	2,807	7,122	1,349,019	781,333	2,130,352	299	25	.....	25	11	7
Alaska	385	1,030	1,642	2,672	330,432	381,510	711,942	266	7	.....	7	.....	.....
Arizona	299	10,261	4,367	14,628	3,286,635	1,366,347	4,652,982	318	42	10	52	19	34
Arkansas	10	9	846	855	1,520	239,105	240,625	281	.....	2	2	1	.....
California[1]	283	3,393	1,496	4,889	993,085	423,255	1,416,340	290	24	2	26	12	27
Colorado	452	3,507	1,252	4,759	962,933	329,928	1,292,861	272	18	7	25	9	15
Connecticut	3	10	34	44	1,500	9,252	10,752	244	1	.....	1	.....	.....
Florida	21	27	4,537	4,564	3,051	1,304,533	1,307,584	286	.....	17	17	6	8
Georgia	16	108	418	526	20,520	84,769	105,289	200	.....	.....	.....	.....	.....
Idaho	331	2,846	1,113	3,959	857,879	299,776	1,157,655	292	12	.....	12	4	5
Illinois	7	390	307	697	115,196	87,233	202,429	290	4	1	5	4	4
Iowa	6	342	37	379	90,475	8,085	98,560	260	.....	.....	.....	.....	.....
Kansas	21	923	396	1,319	247,423	103,593	351,016	266	2	1	3	1	.....
Kentucky	14	271	167	438	70,588	43,142	113,730	260	.....	.....	.....	.....	.....
Maine	5	.....	129	129	.....	29,246	29,246	227	.....	.....	.....	.....	.....
Maryland	6	.....	69	69	.....	19,100	19,100	277	.....	.....	.....	.....	.....
Massachusetts	3	25	9	34	7,575	1,957	9,532	280	.....	.....	.....	.....	.....
Michigan	59	16,784	7,830	24,614	4,961,159	2,344,195	7,305,354	297	45	4	49	32	75
Minnesota	53	5,945	10,194	16,139	1,681,854	3,151,739	4,833,593	299	25	17	42	24	60
Missouri	35	2,896	1,237	4,133	868,596	433,442	1,302,038	315	12	.....	12	10	22
Montana	196	8,406	2,394	10,800	2,523,476	739,749	3,263,225	302	43	2	45	12	8
Nevada	297	2,321	1,449	3,770	694,301	457,619	1,151,920	306	10	2	12	4	.....
New Hampshire[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	6	1,287	459	1,746	342,183	117,063	459,246	263	1	.....	1	1	3
New Mexico	90	1,662	1,552	3,214	469,888	459,752	929,640	289	6	1	7	4	7
New York	26	2,100	1,067	3,167	593,375	300,175	893,550	282	11	3	14	6	19
North Carolina	18	113	286	399	26,230	75,967	102,197	256	.....	1	1	.....	.....
Ohio	3	157	41	198	45,270	10,885	56,155	284	.....	.....	.....	.....	.....
Oklahoma	49	3,391	651	4,042	911,832	166,079	1,077,911	267	10	1	11	3	2
Oregon	118	295	215	510	66,971	39,506	106,477	209	1	.....	1	.....	.....
Pennsylvania	10	28	303	331	7,643	88,177	95,820	289	.....	.....	.....	.....	.....
South Carolina[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	35	881	651	1,532	301,404	227,628	529,032	345	4	1	5	5	8
Tennessee	24	1,380	1,433	2,813	414,817	378,338	793,155	282	5	.....	5	2	3
Texas	11	237	1,487	1,724	80,003	528,819	608,822	353	.....	6	6	4	7
Utah[3]	177	3,217	1,748	4,965	951,574	573,236	1,524,810	307	15	12	27	.....	.....
Vermont	5	57	43	100	17,051	12,822	29,873	299	2	.....	2	1	.....
Virginia	24	589	894	1,483	192,119	217,385	409,504	276	1	.....	1	1	2
Washington	110	476	379	855	123,926	112,226	236,152	276	3	.....	3	.....	.....
Wisconsin	22	1,520	637	2,157	407,390	167,421	574,811	266	5	.....	5	3	.....
Wyoming	19	128	167	295	29,190	40,763	69,953	237	.....	.....	.....	.....	.....
Other States	9	58	455	513	16,304	142,356	158,660	309	.....	1	1	1	.....
Total, 1920	**3,281**	**81,385**	**55,198**	**136,583**	**24,064,387**	**16,297,506**	**40,361,893**	**296**	**334**	**91**	**425**	**180**	**316**
Total, 1919	3,383	90,831	54,431	145,262	25,730,738	14,730,612	40,461,350	281	388	80	468	221	431

[1] All data in this and other tables for 1920 supplied by the Industrial Accidents Commission of California.
[2] Not segregated.
[3] Accident data supplied by the Industrial Commission of Utah.

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TABLE 4.—*ALL MINES: Fatalities, by causes*

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	9	2	.....	2	8	.....	1	.....	.....	.....
Alaska	2	.....	.....	4	.....	1	.....	.....	.....	.....
Arizona	19	.....	1	5	4	.....	1	.....	2	.....
Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	6	.....	.....	4	1	1	.....	.....	3	1
Colorado	6	.....	.....	1	.....	3	1	.....	.....	.....
Connecticut	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	3	.....	.....	.....	1	1	.....	.....	2	.....
Illinois	3	.....	.....	.....	1	.....	.....	.....	.....	.....
Iowa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	.....	.....	.....	1	.....	.....	.....	1	.....	.....
Kentucky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	21	3	1	5	2	2	.....	1	.....	.....
Minnesota	17	.....	1	.....	1	.....	2	.....	1	.....
Missouri	2	1	.....	.....	4	.....	.....	.....	1	.....
Montana	21	1	.....	7	2	6	.....	.....	.....	.....
Nevada	5	.....	.....	.....	1	1	.....	.....	.....	.....
New Hampshire [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico	5	.....	.....	1	.....	.....	.....	.....	.....	.....
New York	1	.....	.....	4	3	.....	.....	1	.....	.....
North Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	4	.....	.....	2	1	.....	.....	.....	.....	.....
Oregon	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	2	1	.....	.....	.....	1	.....	.....	.....	.....
Tennessee	1	.....	.....	.....	.....	1	1	.....	.....	.....
Texas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	3	1	.....	5	.....	.....	.....	.....	.....	.....
Vermont	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	3	.....	.....	.....	.....	.....	.....
Wisconsin	3	.....	.....	.....	.....	1	.....	.....	.....	.....
Wyoming	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other States	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**138**	**9**	**3**	**44**	**29**	**18**	**6**	**3**	**9**	**1**
Total, 1919	164	4	2	41	31	30	10	1	10	1

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
				1	23					2		2
					7							
				1	33	2	2			3	2	9
	2				18	4				2		6
				3	14	2				2		4
					1							
	3			1	11	1						1
					4							
					2							
				3	38	2				3	2	7
					22	2	1					3
				1	9	2	1					3
				3	40	1				2		3
					7	3						3
						1						1
					6							
					9					2		2
	1				8	1	1					2
					1							
					4							
					3					1	1	2
	1				10	1	1	1		2		5
					2							
					1							
					3							
					4					1		1
	7			13	280	22	6	1		20	5	54
4	4			7	309	32	7	2	8	23	7	79

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TABLE 4.—*ALL MINES: Fatalities, by causes and*

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall off ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alabama										
Alaska										
Arizona							1			1
Arkansas	1									1
California									1	1
Colorado	1						1	1	2	5
Connecticut										
Florida		3					1		2	6
Georgia										
Idaho										
Illinois									1	1
Iowa										
Kansas				1						1
Kentucky										
Maine										
Maryland										
Massachusetts										
Michigan	1	1						1	1	4
Minnesota	2	4					1	1	3	11
Missouri										
Montana									2	2
Nevada								1		1
New Hampshire[1]										
New Jersey										
New Mexico										
New York			1				1	1		3
North Carolina										
Ohio										
Oklahoma									1	1
Oregon										
Pennsylvania										
South Carolina[1]										
South Dakota								1		1
Tennessee										
Texas		1		1			1	2		5
Utah								1	7	8
Vermont										
Virginia										
Washington										
Wisconsin										
Wyoming										
Other States							1			1
Total, 1920	**5**	**9**	**1**	**2**			**7**	**9**	**20**	**53**
Total, 1919	2	8	2	11		1	5	4	9	42

[1] Not segregated.

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States, during the year ended Dec. 31, 1920—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		1920
												25
												7
	4	3	1							1	9	52
			1								1	2
	1										1	26
2											2	25
												1
	6			2				1		2	11	17
												12
												5
												3
												49
1		1	2	1				1			6	42
												12
												45
		1									1	12
												1
	1										1	7
												14
1											1	1
												11
												1
												5
												5
			1								1	6
	1	3									4	27
												2
												1
												3
												5
												1
4	13	8	5	3				2		3	38	425
16	7	6	5	2			1	1			38	468

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TABLE 5.—*ALL MINES: Injuries, by causes*

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	128	250	114	10	396	27	91	90	.....	18
Alaska	28	39	4	5	23	7	17	18	1	1
Arizona	1,283	517	508	93	656	123	140	346	10	42
Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	233	76	80	12	115	53	26	73	3	11
Colorado	131	40	43	16	60	15	10	87	1	3
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	3	1	1	1	3	.....	.....	.....	.....	.....
Idaho	201	107	112	3	83	95	10	76	3	5
Illinois	10	11	7	.....	11	1	3	8	.....	1
Iowa	.....	12	2	1	6	.....	.....	3	2	1
Kansas	48	72	5	1	23	3	6	31	.....	2
Kentucky	3	2	1	1	9	.....	1	3	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	1,146	841	576	63	637	103	31	190	20	75
Minnesota	474	85	367	18	173	46	7	45	6	24
Missouri	68	170	9	9	160	12	5	52	8	16
Montana	643	273	346	21	295	76	1	117	2	4
Nevada	102	39	68	7	27	17	23	46	.....	8
New Hampshire[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	19	59	10	12	23	4	6	21	.....	2
New Mexico	90	52	18	9	52	10	5	22	.....	.....
New York	76	334	54	17	108	17	1	163	6	30
North Carolina	.....	9	3	.....	5	.....	.....	2	.....	.....
Ohio	3	2	.....	29	5	.....	.....	.....	.....	1
Oklahoma	201	360	15	13	115	27	8	189	.....	33
Oregon	20	21	22	.....	5	2	3	10	1	2
Pennsylvania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	53	113	16	9	52	2	14	49	.....	4
Tennessee	65	287	42	4	113	4	6	44	.....	23
Texas	22	1	1	1	3	2	1	.....	.....	2
Utah	212	39	179	28	140	31	16	88	1	.....
Vermont	3	4	1	.....	4	.....	.....	1	.....	.....
Virginia	9	7	5	4	11	.....	.....	1	.....	1
Washington	2	5	2	6	10	2	2	7	.....	1
Wisconsin	41	82	19	13	69	6	4	20	1	8
Wyoming	2	1	5	.....	2	.....	.....	.....	.....	.....
Other States	.....	1	.....	.....	1	.....	.....	.....	.....	.....
Total, 1920	**5,319**	**3,912**	**2,635**	**406**	**3,395**	**685**	**437**	**1,802**	**65**	**318**

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
3	.....	.....	17	212	**1,356**	.....	.....	.....	.....	2	.....	**2**
.....	.....	.....	2	33	**178**	.....	.....	.....	.....	.....	5	**5**
.....	6	.....	139	1,204	**5,067**	6	15	1	.....	11	49	**82**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	9	.....	40	173	**904**	7	15	1	.....	26	7	**56**
.....	.....	.....	12	73	**491**	.....	9	.....	3	4	3	**19**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	2	**11**	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	39	242	**976**	4	5	.....	.....	3	3	**15**
.....	.....	.....	8	12	**72**	.....	.....	.....	.....	1	.....	**1**
.....	.....	.....	.....	17	**44**	.....	1	.....	.....	.....	.....	**1**
.....	3	.....	12	113	**319**	3	12	.....	.....	9	4	**28**
.....	.....	.....	2	12	**34**	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	.....	71	531	**4,285**	23	39	1	2	52	51	**168**
.....	26	.....	54	228	**1,553**	5	10	.....	.....	14	4	**33**
.....	4	.....	17	148	**678**	.....	9	.....	.....	7	3	**19**
.....	.....	.....	73	351	**2,202**	.....	12	2	.....	16	42	**72**
.....	3	.....	8	49	**397**	2	8	.....	.....	9	2	**21**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	27	**184**	.....	1	.....	.....	.....	3	**4**
.....	5	.....	5	48	**316**	1	2	.....	.....	2	3	**8**
.....	2	.....	22	99	**929**	1	3	1	1	2	10	**18**
.....	.....	.....	.....	.....	**19**	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	3	**43**	.....	1	.....	.....	.....	.....	**1**
.....	6	1	28	350	**1,346**	9	52	.....	2	56	21	**140**
.....	.....	.....	3	12	**101**	1	1	.....	.....	1	.....	**3**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	108	**420**	1	1	.....	.....	.....	1	**3**
.....	.....	.....	10	67	**665**	2	.....	.....	.....	10	2	**14**
.....	.....	.....	1	20	**54**	.....	.....	.....	.....	.....	1	**1**
.....	1	.....	46	231	**1,012**	5	22	1	1	20	22	**71**
.....	.....	.....	.....	1	**14**	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	5	**44**	.....	.....	.....	.....	1	1	**2**
.....	.....	.....	.....	12	**49**	.....	.....	.....	.....	2	.....	**2**
.....	.....	.....	13	74	**350**	2	11	.....	.....	4	5	**22**
3	.....	.....	.....	6	**19**	.....	.....	.....	.....	.....	1	**1**
.....	.....	.....	.....	.....	**2**	.....	.....	.....	.....	.....	.....	.....
6	**66**	**1**	**624**	**4,463**	**24,134**	**72**	**229**	**7**	**9**	**252**	**243**	**812**

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TABLE 5.—*ALL MINES: Injuries, by causes and States,*

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alabama	18	.....	2	10	4	18	.....	8	30	90
Alaska	7	1	1	8	4	8	.....	5	40	74
Arizona	48	8	19	57	37	58	2	63	500	792
Arkansas	20	.....	.....	7	1	8	.....	4	10	50
California	16	.....	.....	22	15	18	2	16	79	168
Colorado	9	4	7	19	6	31	.....	14	63	153
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	3	16	.....	28	61	53	2	68	147	378
Georgia	1	1	.....	.....	.....	.....	.....	.....	3	5
Idaho	5	2	1	17	4	9	.....	13	59	110
Illinois	1	.....	2	1	1	2	1	4	10	22
Iowa	.....	.....	.....	.....	.....	.....	.....	1	5	6
Kansas	.....	2	2	7	5	5	.....	8	37	66
Kentucky	.....	.....	.....	.....	3	3	1	1	.....	8
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	20	20	18	115	31	115	8	71	335	733
Minnesota	29	66	6	73	51	92	7	53	219	596
Missouri	1	3	1	6	12	10	.....	5	17	55
Montana	33	.....	.....	23	15	39	1	10	111	232
Nevada	7	7	2	13	1	7	.....	9	35	81
New Hampshire [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	.....	.....	.....	.....	1	.....	.....	.....	11	12
New Mexico	9	8	3	6	9	23	1	7	67	133
New York	14	10	6	18	13	35	11	33	90	230
North Carolina	.....	.....	.....	.....	1	3	.....	.....	.....	4
Ohio	.....	.....	.....	.....	.....	.....	.....	.....	18	18
Oklahoma	6	2	2	7	14	9	.....	33	61	134
Oregon	3	.....	.....	1	.....	2	1	6	9	22
Pennsylvania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	3	.....	.....	3	2	7	3	4	23	45
Tennessee	18	4	4	19	5	27	2	17	43	139
Texas	2	1	.....	33	72	57	.....	70	109	344
Utah	15	5	1	21	14	32	7	30	46	171
Vermont	1	.....	.....	1	.....	1	.....	.....	1	4
Virginia	5	6	.....	1	1	2	.....	1	7	23
Washington	.....	.....	.....	.....	1	2	1	.....	12	16
Wisconsin	3	.....	.....	6	8	9	1	6	36	69
Wyoming	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Other States	1	1	1	3	9	8	.....	.....	37	60
Total, 1920	**298**	**167**	**78**	**526**	**401**	**693**	**51**	**560**	**2,270**	**5,044**

[1] Not segregated.

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during the year ended Dec. 31, 1920—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		1920
4	.....	16	7	6	.....	1	10	.....	17	39	100	1,548
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	257
11	7	30	42	18	2	.....	7	.....	54	263	434	6,375
8	2	6	3	4	3	.....	1	.....	7	1	35	85
2	.....	.....	.....	2	.....	.....	1	.....	1	4	10	1,138
1	.....	.....	.....	1	.....	.....	1	.....	1	1	5	668
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1
7	22	49	7	20	4	.....	67	2	38	148	364	742
.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	2	18
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,101
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	413
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42
1	2	.....	.....	1	.....	.....	.....	.....	.....	8	12	12
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0
15	4	22	6	13	.....	.....	1	1	22	26	110	5,296
115	24	82	109	50	11	.....	27	.....	84	286	788	2,970
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	753
5	.....	.....	.....	.....	.....	.....	1	.....	.....	1	7	2,513
13	3	16	6	9	.....	.....	4	.....	8	36	95	594
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	201
21	3	10	11	21	1	.....	16	.....	36	76	195	652
.....	.....	1	1	.....	.....	.....	.....	.....	2	2	6	1,183
3	.....	.....	.....	.....	1	.....	1	.....	.....	5	10	33
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	67
2	.....	1	.....	2	.....	.....	2	.....	2	.....	9	1,629
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	126
4	.....	3	.....	.....	.....	.....	2	1	3	3	16	16
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	468
4	2	4	9	.....	.....	.....	.....	.....	3	1	23	841
2	6	1	4	1	.....	.....	4	.....	11	7	36	435
42	13	23	14	19	.....	.....	11	3	35	102	262	1,516
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18
3	.....	2	1	2	.....	.....	.....	.....	1	3	12	81
3	.....	.....	.....	1	.....	.....	.....	.....	.....	8	12	79
6	.....	.....	.....	.....	.....	.....	.....	.....	1	2	9	450
6	.....	.....	1	1	.....	.....	.....	.....	.....	.....	8	29
.....	2	.....	.....	.....	.....	.....	.....	.....	2	.....	4	66
280	90	267	222	171	22	1	156	7	328	1,028	2,572	32,562

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ACCIDENT STATISTICS, BY GROUPS OF MINES.

COPPER MINES.

Reports received from mines producing copper in 1920 show that accidents during the year resulted in 128 deaths and 12,047 nonfatal injuries, a decrease of 12 fatal and 189 nonfatal accidents as compared with the preceding year. The copper-mining industry employed 35,254 men who worked 11,182,119 shifts, a decrease of 4,073 men and 674,372 shifts as compared with 1919. Each mine employee averaged 317 working days, as against 301 in the year before. The fatality rate was 3.43 (3.54 in 1919) and the injury rate was 323.20 (309.60 in 1919) per 1,000 men employed, based upon a standard of 300 working days. Reports were received from 387 operating companies in 1920 as compared with 410 the previous year.

Comparing the nonfatal accidents by causes, on the basis of the number of 300-day workers, shows that the injury rate per 1,000 employees was less from accidents due to falls of rock from roof or wall, run of ore from chute or pocket, and objects falling down shafts.

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

At mines producing gold, silver, and miscellaneous metals, accidents resulted in 117 deaths and 5,704 injuries, a reduction of 9 fatalities and an increase of 235 nonfatal accidents as compared with the year 1919. The figures for this branch of the industry include all metal mines except those producing copper and iron and those in the Mississippi Valley producing lead and zinc. The number of employees was 29,933, and they worked a total of 8,354,830 shifts, an average of 279 shifts per man. The latter figure represents an increase of 12 working days for each employee; but there was a loss of 222,265 in total shifts worked and a reduction of 2,197 in the number of men employed as compared with 1919.

The fatal accident rate for this group of mines fell from 4.41 in 1919 to 4.20 in 1920, but the nonfatal injury rate increased from 191.29 to 204.82 per 1,000 employed.

An increase from 226 to 238 in the underground injury rate per 1,000 employees was chargeable largely to timber and hand tools and miscellaneous accidents not covered by the standard classification of causes. The injury rate from shaft accidents declined from 11.6 to to 9.9 per thousand 300-day workers. At open-pit operations the injury rate fell from 100 to 58, the decrease being credited to falls or slides of rock, haulage, falls of persons, machinery, and hand tools.

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IRON MINES.

Accidents at iron mines in 1920 caused the death of 106 employees and the injury of 9,072, a reduction of 33 fatalities and 26 injuries from the figures for 1919. There were 45,990 men engaged in the mining of iron ore and they worked 13,574,788 shifts, an average of 295 shifts per employee. These figures represent a decrease of 1,686 employees, an increase of 86,175 shifts, and an increase of 12 working days per man. The accident rates were 2.34 killed and 200.49 injured per 1,000 men employed (300-day workers) as compared with 3.09 killed and 202.35 injured in 1919.

The injury rate from accidents underground rose from 245 to 263 per 1,000 employees, whereas the rate for open-pit mining declined from 136 to 115.

The net decrease of 18 nonfatal accidents per 1,000 employees in the injury rate for underground mining operations was distributed generally among most of the enumerated causes of underground accidents. There were, however, decreases in the injury rates due to falls of rock from roof or wall, falling down chutes, winzes, etc., and miscellaneous accidents underground. Stripping operations showed a reduction in the nonfatal accident rates from falls or slides of rock, steam shovels, hand tools, and miscellaneous causes. Shaft accidents declined from 7.4 per 1,000 employees to 6.8. Accidents at surface shops and yards fell from 119 to 115 per 1,000 men employed.

LEAD AND ZINC MINES.

Fatal accidents at lead and zinc mines in the Mississippi Valley States declined from 45 in 1919 to 36 in 1920. Nonfatal accidents increased from 3,185 to 3,607. The resulting accident rates per 1,000 men employed (300-day workers) were 3.27 killed and 327.97 injured in 1920 as against 4.13 killed and 292.28 injured the year before.

According to the operators' reports, 11,638 men were employed at the mines, working a total of 3,299,278 shifts, an average of 283 shifts per man. As compared with the preceding year, these figures show 1,330 fewer men employed, but a gain of 30,052 shifts, and a gain of 31 working days per man.

For underground mining operations the injury rate rose from 317 to 368 per 1,000 employees. The increased rate was most notable in accidents caused by rock or ore while loading at working face, haulage, drilling, machinery, and stepping on nail. There was a decrease in falls of rock from roof or wall and persons falling down chutes and winzes. The injury rate from shaft accidents rose from 18 to 24 per 1,000 employees, due chiefly to objects falling down shafts and to accidents caused by skips and cages. Surface accidents

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showed a reduction of the injury rate from 150 to 139 per 1,000 men employed, the reduction being due to a diminution in the number of miscellaneous accidents, as most of the usual causes of surface accidents showed increased injury rates.

NONMETALLIC MINERAL MINES.

Mines producing nonmetallic minerals reported 13,768 employees, an increase of 607 over the number working in 1919. The total shifts worked numbered 3,950,878, an increase of 680,953, and the average working days per man was 287 as compared with 248 the year before.

Accidents resulted in 38 deaths and 2,132 injuries as against 18 deaths and 1,518 injuries during the previous year. The accident rates per 1,000 employees (300-day workers) were 2.89 killed and 161.88 injured. For 1919 the corresponding rates were 1.65 and 139.27. Injuries caused by accidents underground resulted mainly from falls of rock from roof or wall, handling rock, haulage, drilling, and "miscellaneous" causes. Shaft accidents showed but little change, the rate being 5.1 per 1,000 as compared with 4.2 for the previous year. Accidents at open-pit mines increased from 86 per 1,000 employees in 1919 to 109 per 1,000 in 1920, the main increases being due to explosives, haulage, steam shovels, machinery, and hand tools, while there was a decrease in the rate chargeable to falls of persons. Accidents at surface shops and yards resulted in the injury of 194 persons of every 1,000 employed as compared with 178 the year before. In this group of accidents increased rates are noted from persons stepping on nails, hand tools, and "miscellaneous," but lower rates for mine cars, falls of persons, and machinery.

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TABLE 6.—*COPPER MINES: Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Underground.	Surface.	Total.	Underground.	Surface.	Total.		Underground.	Surface.	Total.		
Alaska	6	402	291	693	146,328	105,962	252,290	364	2	.....	2	.....	.....
Arizona	126	9,133	3,855	12,988	2,989,207	1,234,493	4,223,700	325	35	10	45	18	30
California	19	518	287	805	158,351	95,238	253,589	315	5	.....	5	2	3
Idaho	36	146	66	212	37,120	14,985	52,105	246	1	.....	1	.....	.....
Michigan	20	4,935	2,537	7,472	1,489,621	765,322	2,254,943	302	20	2	22	14	32
Montana	30	6,029	1,625	7,654	1,832,916	546,732	2,379,648	311	32	1	33	7	7
Nevada	27	312	607	919	101,999	211,732	313,731	341	1	1	2	1	.....
New Mexico	22	847	959	1,806	254,426	329,535	583,961	323	4	1	5	2	3
Oregon	9	72	12	84	21,415	2,925	24,340	290	1	.....	1	.....	.....
Utah	36	564	1,061	1,625	180,950	381,065	562,015	346	2	6	8	.....	.....
Washington	30	145	59	204	40,967	12,301	53,268	261	.....	.....	.....	.....	.....
Other States	26	568	224	792	165,925	62,604	228,529	289	4	.....	4	2	3
Total, 1920	387	23,671	11,583	35,254	7,419,225	3,762,894	11,182,119	317	107	21	128	46	78
Total, 1919	410	27,298	12,029	39,327	8,162,636	3,693,855	11,856,491	301	120	20	140	59	109

TABLE 7.—*COPPER MINES: Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	Total.	Underground.	Surface.	Total.	Underground.	Surface.	Total.
Alaska	488	353	841	4.10	.....	2.38	.....	.....	.....
Arizona	9,964	4,115	14,079	3.51	2.43	3.21	.....	.....	.....
California	528	317	845	9.47	.....	5.92	.....	.....	.....
Idaho	124	50	174	8.06	.....	5.75	.....	.....	.....
Michigan	4,965	2,551	7,516	4.03	.78	2.93	.....	.....	.....
Montana	6,110	1,822	7,932	5.24	.55	4.16	.....	.....	.....
Nevada	340	706	1,046	2.94	1.42	1.91	.....	.....	.....
New Mexico	848	1,099	1,947	4.72	.91	2.57	.....	.....	.....
Oregon	71	10	81	14.08	.....	12.35	.....	.....	.....
Utah	603	1,270	1,873	3.32	4.72	4.27	.....	.....	.....
Washington	137	41	178	.....	.....	.....	.....	.....	.....
Other States	553	209	762	7.23	.....	5.25	.....	.....	.....
Total, 1920	24,731	12,543	37,274	4.33	1.67	3.43	389.15	193.18	323.20
Total, 1919	27,209	12,313	39,522	4.41	1.62	3.54	367.60	181.43	309.60

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TABLE 8.—*GOLD, SILVER, AND MISCELLANEOUS METAL MINES: Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Underground.	Surface.	Total.	Underground.	Surface.	Total.		Underground.	Surface.	Total.		
Alaska	378	613	1,339	**1,952**	180,504	272,668	**453,172**	232	5	.....	**5**	.....	.....
Arizona	169	1,048	482	**1,530**	270,878	122,184	**393,062**	257	7	.....	**7**	1	4
California	239	2,476	1,008	**3,484**	708,817	268,235	**977,052**	280	18	1	**19**	9	23
Colorado	415	3,379	1,126	**4,505**	934,607	299,813	**1,234,420**	274	17	5	**22**	7	11
Georgia	3	.....	124	**124**	.....	22,580	**22,580**	182	.....	.....	.....	.....	.....
Idaho	291	2,655	1,041	**3,696**	807,849	283,095	**1,090,944**	295	11	.....	**11**	4	5
Montana	163	2,349	767	**3,116**	682,930	192,927	**875,857**	281	10	1	**11**	5	1
Nevada	263	1,934	658	**2,592**	567,527	187,358	**754,885**	291	8	1	**9**	3	.....
New Mexico	60	619	329	**948**	161,477	62,967	**224,444**	237	1	.....	**1**	1	4
New York	3	150	49	**199**	25,990	13,725	**39,715**	200	3	.....	**3**	1	.....
North Carolina[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	107	213	200	**413**	43,096	35,771	**78,867**	191	.....	.....	.....	.....	.....
South Dakota	31	875	641	**1,516**	300,167	225,133	**525,300**	347	4	1	**5**	5	8
Tennessee[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	126	2,539	591	**3,130**	740,240	166,289	**906,529**	290	13	6	**19**	.....	.....
Virginia	7	142	187	**329**	71,578	40,387	**111,965**	340	.....	.....	.....	.....	.....
Washington	76	258	88	**346**	57,259	15,875	**73,134**	211	3	.....	**3**	.....	.....
Wyoming	12	16	15	**31**	1,100	1,500	**2,600**	84	.....	.....	.....	.....	.....
Other States	15	811	1,211	**2,022**	252,764	337,540	**590,304**	292	.....	2	**2**	1	.....
Total, 1920	**2,358**	**20,077**	**9,856**	**29,933**	**5,806,783**	**2,548,047**	**8,354,830**	**279**	**100**	**17**	**117**	**37**	**56**
Total, 1919	2,430	21,868	10,262	**32,130**	5,887,825	2,689,270	**8,577,095**	267	113	13	**126**	49	72

[1] **Not segregated.**

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TABLE 9.—*GOLD, SILVER, AND MISCELLANEOUS METAL MINES: Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**
Alaska	602	909	**1,511**	8.31	.....	**3.31**	.....	.....	.....
Arizona	903	407	**1,310**	7.75	.....	**5.34**	.....	.....	.....
California	2,363	894	**3,257**	7.62	1.12	**5.83**	.....	.....	.....
Colorado	3,115	1,000	**4,115**	5.46	5.00	**5.35**	.....	.....	.....
Georgia	.....	75	**75**	.....	.....	.....	.....	.....	.....
Idaho	2,693	944	**3,637**	4.08	.....	**3.02**	.....	.....	.....
Montana	2,276	643	**2,919**	4.39	1.56	**3.77**	.....	.....	.....
Nevada	1,892	624	**2,516**	4.23	1.60	**3.58**	.....	.....	.....
New Mexico	538	210	**748**	1.86	.....	**1.34**	.....	.....	.....
New York	86	46	**132**	34.88	.....	**22.73**	.....	.....	.....
North Carolina[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	144	119	**263**	.....	.....	.....	.....	.....	.....
South Dakota	1,001	750	**1,751**	4.00	1.33	**2.86**	.....	.....	.....
Tennessee[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	2,467	554	**3,021**	5.27	10.83	**6.29**	.....	.....	.....
Virginia	238	135	**373**	.....	.....	.....	.....	.....	.....
Washington	191	53	**244**	15.71	.....	**12.30**	.....	.....	.....
Wyoming	4	5	**9**	.....	.....	.....	.....	.....	.....
Other States	843	1,125	**1,968**	.....	1.78	**1.02**	.....	.....	.....
Total, 1920	**19,356**	**8,493**	**27,849**	**5.17**	**2.00**	**4.20**	**247.68**	**107.15**	**204.82**
Total, 1919	19,626	8,964	**28,590**	5.76	1.45	**4.41**	237.24	90.70	**191.29**

[1] Not segregated.

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TABLE 10.—*IRON MINES: Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.		Under-ground.	Surface.	Total.		
Alabama	16	4,315	2,652	**6,967**	1,349,019	752,428	**2,101,447**	302	25	.....	**25**	11	7
Georgia	3	80	154	**234**	14,400	29,562	**43,962**	188	.....	.....	.....	.....	.....
Michigan	34	11,698	5,224	**16,922**	3,427,372	1,558,216	**4,985,588**	295	25	2	**27**	18	43
Minnesota	51	5,945	10,060	**16,005**	1,681,854	3,122,639	**4,804,493**	300	25	17	**42**	24	60
Missouri[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	4	706	354	**1,060**	167,204	85,973	**253,177**	239	1	.....	**1**	1	3
New Mexico	3	160	143	**303**	42,425	46,100	**88,525**	292	1	.....	**1**	1	.....
New York	6	1,091	466	**1,557**	340,378	147,983	**488,361**	314	5	1	**6**	3	15
Pennsylvania[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	5	280	181	**461**	74,655	41,296	**115,951**	252	.....	.....	.....	.....	.....
Virginia	10	327	428	**755**	85,141	101,042	**186,183**	247	1	.....	**1**	1	2
Wisconsin	6	760	258	**1,018**	232,235	79,475	**311,710**	306	1	.....	**1**	1	.....
Other States	16	265	443	**708**	69,232	126,159	**195,391**	276	2	.....	**2**	.....	.....
Total, 1920	**154**	**25,627**	**20,363**	**45,990**	**7,483,915**	**6,090,873**	**13,574,788**	**295**	**86**	**20**	**106**	**60**	**130**
Total, 1919	157	28,234	19,442	**47,676**	8,216,645	5,271,968	**13,488,613**	292	107	32	**139**	77	176

[1] Not segregated.

TABLE 11.—*IRON MINES: Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.
Alabama	4,497	2,508	**7,005**	5.56	.....	**3.57**	.....	.....	.....
Georgia	48	99	**147**	.....	.....	.....	.....	.....	.....
Michigan	11,424	5,194	**16,618**	2.19	.39	**1.62**	.....	.....	.....
Minnesota	5,606	10,409	**16,015**	4.46	1.63	**2.62**	.....	.....	.....
Missouri[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	557	287	**844**	1.80	.....	**1.18**	.....	.....	.....
New Mexico	141	154	**295**	7.09	.....	**3.39**	.....	.....	.....
New York	1,135	493	**1,628**	4.41	2.03	**3.69**	.....	.....	.....
Pennsylvania[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	249	137	**386**	.....	.....	.....	.....	.....	.....
Virginia	284	337	**621**	3.52	.....	**1.61**	.....	.....	.....
Wisconsin	774	265	**1,039**	1.29	.....	**.96**	.....	.....	.....
Other States	231	420	**651**	8.66	.....	**3.07**	.....	.....	.....
Total, 1920	**24,946**	**20,303**	**45,249**	**3.45**	**.99**	**2.34**	**269.94**	**115.16**	**200.49**
Total, 1919	27,389	17,573	**44 962**	3.91	1.82	**3.09**	252.18	124.68	**202.35**

[1] Not segregated.

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TABLE 12.—*LEAD AND ZINC MINES (Mississippi Valley): Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Underground.	Surface.	Total.	Underground.	Surface.	Total.		Underground.	Surface.	Total.		
Arkansas	4	9	7	16	1,520	1,095	2,615	163	.....	.....	.....	.....	.....
Illinois	7	390	307	697	115,196	87,233	202,429	290	4	1	5	4	4
Kansas	16	823	297	1,120	220,868	77,103	297,971	266	1	1	2	.....	.....
Missouri	20	2,841	889	3,730	852,096	340,072	1,192,168	320	12	.....	12	10	22
Oklahoma	45	3,361	609	3,970	902,892	157,562	1,060,454	267	10	1	11	3	2
Tennessee [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	14	760	337	1,097	175,155	75,608	250,763	229	4	.....	4	2	.....
Other States	13	677	331	1,008	198,523	94,355	292,878	291	2	.....	2	.....	.....
Total, 1920	119	8,861	2,777	11,638	2,466,250	833,028	3,299,278	283	33	3	36	19	28
Total, 1919	141	10,075	2,893	12,968	2,528,821	740,405	3,269,226	252	42	3	45	27	54

[1] Not segregated.

TABLE 13.—*LEAD AND ZINC MINES (Mississippi Valley): Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	Total.	Underground.	Surface.	Total.	Underground.	Surface.	Total.
Arkansas	5	4	9	.....	.....	.....	.....	.....	.....
Illinois	384	291	675	10.42	3.44	7.41	.....	.....	.....
Kansas	736	257	993	1.36	3.89	2.01	.....	.....	.....
Missouri	2,840	1,134	3,974	4.23	.....	3.02	.....	.....	.....
Oklahoma	3,010	525	3,535	3.32	1.90	3.11	.....	.....	.....
Tennessee [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	584	252	836	6.85	.....	4.78	.....	.....	.....
Other States	662	314	976	3.02	.....	2.05	.....	.....	.....
Total, 1920	8,221	2,777	10,998	4.01	1.08	3.27	392.04	138.28	327.97
Total, 1919	8,429	2,468	10,897	4.98	1.22	4.13	334.80	147.08	292.28

[1] Not segregated.

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TABLE 14.—***NONMETALLIC MINERAL MINES:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1920.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Underground.	Surface.	Total.	Underground.	Surface.	Total.		Underground.	Surface.	Total.		
California	25	399	201	**600**	125,917	59,782	**185,699**	309	1	1	**2**	1	1
Florida	21	27	4,537	**4,564**	3,051	1,304,533	**1,307,584**	286	.....	17	**17**	6	8
Georgia	9	22	131	**153**	5,460	31,637	**37,097**	242	.....	.....	.....	.....	.....
Iowa	6	342	37	**379**	90,475	8,085	**98,560**	260	.....	.....	.....	.....	.....
Maine	4	.....	126	**126**	.....	28,946	**28,946**	230	.....	.....	.....	.....	.....
Michigan	5	151	69	**220**	44,166	20,657	**64,823**	295	.....	.....	.....	.....	.....
Missouri	14	55	328	**383**	16,500	90,970	**107,470**	281	.....	.....	.....	.....	.....
New York	17	859	552	**1,411**	227,007	138,467	**365,474**	259	3	2	**5**	2	4
North Carolina	16	43	249	**292**	8,990	66,825	**75,815**	260	.....	1	**1**	.....	.....
Ohio	3	157	41	**198**	45,270	10,885	**56,155**	284	.....	.....	.....	.....	.....
Pennsylvania	9	28	94	**122**	7,643	21,297	**28,940**	237	.....	.....	.....	.....	.....
Tennessee	13	127	867	**994**	36,444	217,933	**254,377**	256	.....	.....	.....	.....	.....
Texas	7	12	1,421	**1,433**	3,468	506,397	**509,865**	356	.....	6	**6**	4	7
Utah	10	87	74	**161**	24,862	19,693	**44,555**	277	.....	.....	.....	.....	.....
Vermont	5	57	43	**100**	17,051	12,822	**29,873**	299	2	.....	**2**	1	.....
Virginia	7	120	279	**399**	35,400	75,956	**111,356**	279	.....	.....	.....	.....	.....
Other States	92	663	1,570	**2,233**	196,510	447,779	**644,289**	289	2	3	**5**	4	4
Total, 1920	**263**	**3,149**	**10,619**	**13,768**	**888,214**	**3,062,664**	**3,950,878**	**287**	**8**	**30**	**38**	**18**	**24**
Total, 1919	245	3,356	9,805	13,161	934,811	2,335,114	3,269,925	248	6	12	18	9	20

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TABLE 15.—*NONMETALLIC MINERAL MINES: Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**
California	**420**	**199**	**619**	**2.38**	**5.03**	**3.23**			
Florida	**10**	**4,349**	**4,359**		**3.91**	**3.90**			
Georgia	**18**	**106**	**124**						
Iowa	**301**	**27**	**328**						
Maine		**96**	**96**						
Michigan	**147**	**69**	**216**						
Missouri	**55**	**303**	**358**						
New York	**757**	**461**	**1,218**	**3.96**	**4.34**	**4.11**			
North Carolina	**30**	**223**	**253**		**4.48**	**3.95**			
Ohio	**151**	**36**	**187**						
Pennsylvania	**25**	**71**	**96**						
Tennessee	**122**	**726**	**848**						
Texas	**12**	**1,688**	**1,700**		**3.55**	**3.53**			
Utah	**83**	**66**	**149**						
Vermont	**57**	**43**	**100**	**35.09**		**20.00**			
Virginia	**118**	**253**	**371**						
Other States	**655**	**1,493**	**2,148**	**3.05**	**2.01**	**2.33**			
Total, 1920	**2,961**	**10,209**	**13,170**	**2.70**	**2.94**	**2.89**	**192.84**	**152.90**	**161.88**
Total, 1919	3,116	7,784	10,900	1.93	1.54	1.65	132.86	141.83	139.27

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TABLE 16.—*FATALITIES: By kinds of mines, causes,*

COPPER MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills.)
	1	2	3	4	5	6	7	8	9	10
Alaska	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
Arizona	17	.....	1	4	4	.....	1	.....	2	.....
California	.....	.....	.....	1	.....	1	.....	.....	.....	.....
Idaho	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	8	1	.....	3	1	1	.....	.....	.....	.....
Montana	16	1	.....	4	2	4	.....	.....	.....	.....
Nevada	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other States	.....	.....	.....	.....	.....	1	1	.....	.....	.....
Total, 1920	**47**	**2**	**1**	**14**	**7**	**7**	**2**	.....	**2**	.....
Total, 1919	50	1	.....	10	8	12	2	1	2	1

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

Alaska	2	.....	.....	2	.....	1	.....	.....	.....	.....
Arizona	2	.....	.....	1	.....	.....	.....	.....	.....	.....
California	6	.....	.....	2	1	.....	.....	.....	3	1
Colorado	6	.....	.....	1	.....	3	1	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	3	.....	.....	.....	1	1	.....	.....	2	.....
Montana	4	.....	.....	3	.....	2	.....	.....	.....	.....
Nevada	5	.....	.....	.....	1	1	.....	.....	.....	.....
New Mexico	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	.....	.....	.....	1	.....	.....	.....	1	.....	.....
North Carolina [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	2	1	.....	.....	.....	1	.....	.....	.....	.....
Tennessee [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	2	1	.....	5	.....	.....	.....	.....	.....	.....
Virginia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	3	.....	.....	.....	.....	.....	.....
Wyoming	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other States	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**33**	**2**	.....	**18**	**3**	**9**	**1**	**1**	**5**	**1**
Total, 1919	31	2	1	17	3	13	2	.....	5	.....

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920.

COPPER MINES.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
					2							
				1	30	1	2			2		5
	2				4	1						1
						1						1
				2	16	1				1	2	4
				3	30					2		2
						1						1
					4							
					1							
					1		1					1
					2	1				1		2
	2			6	90	6	3			6	2	17
1	1			3	92	11		2	3	10	2	28

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

					5							
					3	1				1	2	4
					13	3				2		5
				3	14	1				2		3
	3			1	11							
					9	1						1
					7	1						1
					1							
					2					1		1
					4							
	1				9	1		1		2		4
					3							
2	4			4	81	8		1		8	2	19
	2			2	80	15	2		5	7	4	33

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TABLE 16.—*FATALITIES: By kinds of mines, causes*

COPPER MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alaska										
Arizona							1			1
California										
Idaho										
Michigan		1							1	2
Montana									1	1
Nevada										
New Mexico										
Oregon										
Utah									2	2
Washington										
Other States										
Total, 1920		1					1		4	6
Total, 1919	1		1	2					1	5

GOLD SILVER, AND MISCELLANEOUS METAL MINES.

Alaska										
Arizona										
California										
Colorado	1						1	1	2	5
Georgia										
Idaho										
Montana									1	1
Nevada								1		1
New Mexico										
New York										
North Carolina [1]										
Oregon										
South Dakota								1		1
Tennessee [1]										
Utah								1	5	6
Virginia										
Washington										
Wyoming										
Other States	1									1
Total, 1920	2						1	4	8	15
Total, 1919				2		1		2	5	10

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920—Continued.

COPPER MINES.

Open pit.												Grand total.	
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.		
31	32	33	34	35	36	37	38	39	40	41		1920	1919.
												2	4
	4	3	1							1	9	45	49
												5	2
												1	1
												22	32
												33	32
		1									1	2	7
	1										1	5	5
												1	
	1	3									4	8	7
												4	1
	6	7	1							1	15	128	
8	2	2	2					1			15		140

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

												5	6
												7	12
	1										1	19	16
												22	31
												11	11
												11	9
												9	13
												1	7
												3	3
												5	5
												19	8
												3	1
			1								1	2	4
	1		1								2	117	
2				1							3		126

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TABLE 16.—***FATALITIES:*** *By kinds of mines, causes,*

IRON MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	9	2	.....	2	8	.....	1	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	13	2	1	2	1	1	.....	1	.....	.....
Minnesota	17	.....	1	.....	1	.....	2	.....	1	.....
Missouri [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
New York	1	.....	.....	2	2	.....	.....	.....	.....	.....
Pennsylvania [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Other States	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**42**	**4**	**2**	**7**	**12**	**2**	**3**	**1**	**1**	.....
Total, 1919	61	1	.....	7	17	5	2	.....	2	.....

LEAD AND ZINC MINES.

Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois	3	.....	.....	.....	1	.....	.....	.....	.....	.....
Kansas	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Missouri	2	1	.....	.....	4	.....	.....	.....	1	.....
Oklahoma	4	.....	.....	2	1	.....	.....	.....	.....	.....
Tennessee [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other States	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**13**	**1**	.....	**3**	**6**	.....	.....	.....	**1**	.....
Total, 1919	19	.....	1	7	2	.....	4	.....	.....	.....

NONMETALLIC MINERAL MINES.

All States, 1920	**3**	.....	.....	**2**	**1**	.....	.....	**1**	.....	.....
All States, 1919	3	.....	.....	.....	1	.....	.....	.....	1	.....

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920—Continued.

IRON MINES

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
				1	23					2		2
				1	22	1				2		3
					22	2	1					3
						1						1
					1							
					5							
					1							
					1							
					1	1						1
				2	76	5	1			4		10
1	1				97	3	3			3	1	10

LEAD AND ZINC MINES.

					4							
					1							
				1	9	2	1					3
	1				8	1	1					2
					3					1		1
					1						1	1
	1			1	26	3	2			1	1	7
				2	35	3	1			3		7

NONMETALLIC MINERAL MINES.

					7					1		1
					5		1					1

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TABLE 16.—***FATALITIES:*** *By kinds of mines, causes,*

IRON MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total, surface.**
	22	23	24	25	26	27	28	29	30	
Alabama										
Georgia										
Michigan	1							1		2
Minnesota	2	4					1	1	3	11
Missouri [1]										
New Jersey										
New Mexico										
New York							1			1
Pennsylvania [1]										
Tennessee										
Virginia										
Wisconsin										
Other States										
Total, 1920	3	4					2	2	3	14
Total, 1919	1	7		5			1	1	2	17

LEAD AND ZINC MINES.

Arkansas										
Illinois									1	1
Kansas				1						1
Missouri										
Oklahoma									1	1
Tennessee [1]										
Wisconsin										
Other States										
Total, 1920				1					2	3
Total, 1919				2			1			3

NONMETALLIC MINERAL MINES.

All States, 1920		4	1	1			3	3	3	15
All States, 1919		1	1				3	1	1	7

[1] Not segregated.

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and States, during the year ended Dec. 31, 1920—Continued.

IRON MINES.

Open pit.												Grand total.	
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.		
31	32	33	34	35	36	37	38	39	40	41		1920	1919
												25	29
												27	48
1		1	2	1				1			6	42	45
												1	1
												1	5
												1	1
												6	5
												1	2
												1	1
												2	2
1		1	2	1				1			6	106	
5	2	4	3	1							15		139

LEAD AND ZINC MINES.

												5	2
												2	3
												12	10
												11	17
												4	7
												2	6
												36	
													45

NONMETALLIC MINERAL MINES.

3	6		1	2				1		2	15	38	
1	3						1				5		13

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TABLE 17.—*ALL MINES: Fatalities and injuries, by causes*

NUMBER KILLED.

Kind of mine.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Copper	47	2	1	14	7	7	2	.....	2	.....
Gold, silver and miscellaneous metal	33	2	.....	18	3	9	1	1	5	1
Iron	42	4	2	7	12	2	3	1	1	.....
Lead and zinc (Mississippi Valley)	13	1	.....	3	6	.....	.....	.....	1	.....
Nonmetallic mineral	3	.....	.....	2	1	.....	.....	1	.....	.....
Total, 1920	**138**	**9**	**3**	**44**	**29**	**18**	**6**	**3**	**9**	**1**
Percentage of grand total killed	32.47	2.11	.71	10.35	6.82	4.24	1.41	.71	2.11	.24
Percentage of class total killed	49.29	3.22	1.07	15.71	10.36	6.43	2.14	1.07	3.21	.36
Number killed per 1,000 300-day workers employed underground	1.73	.11	.04	.55	.36	.23	.07	.04	.11	.01

NUMBER INJURED.

Copper	2,450	1,243	1,032	135	1,221	273	173	597	12	72
Gold, silver and miscellaneous metal	990	575	524	99	522	220	115	474	11	34
Iron	1,441	1,157	983	97	1,101	133	123	386	28	117
Lead and zinc (Mississippi Valley)	369	852	81	37	442	47	24	289	9	80
Nonmetallic mineral	69	85	15	38	109	12	2	56	5	15
Total, 1920	**5,319**	**3,912**	**2,635**	**406**	**3,395**	**685**	**437**	**1,802**	**65**	**318**
Percentage of grand total injured	16.33	12.01	8.09	1.25	10.43	2.11	1.34	5.53	.20	.98
Percentage of class total injured	22.04	16.21	10.92	1.68	14.07	2.84	1.81	7.47	.27	1.32
Number injured per 1,000 300-day workers employed underground	66.31	48.77	32.85	5.06	42.32	8.54	5.45	22.47	.81	3.97

1911–1919.

Fatalities, 1911 to 1919: Number (total United States)	1,764	71	44	573	281	399	83	13	122	24
Percentage of grand total	30.34	1.22	.76	9.86	4.83	6.86	1.43	.22	2.10	.41
Injuries, 1911 to 1919: Number (total United States)	65,420	33,378	28,176	4,059	35,484	8,321	7,091	15,910	622	3,555
Percentage of grand total	20.15	10.28	8.68	1.25	10.93	2.56	2.18	4.90	.19	1.10

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and kinds of mines, during the year ended Dec. 31, 1920.

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
.....	2	.....	.....	6	**90**	6	3	.....	.....	6	2	**17**
.....	4	.....	.....	4	**81**	8	.....	1	.....	8	2	**19**
.....	.....	.....	.....	2	**76**	5	1	.....	.....	4	.....	**10**
.....	1	.....	.....	1	**26**	3	2	.....	.....	1	1	**7**
.....	.....	.....	.....	.....	**7**	.....	.....	.....	.....	1	.....	**1**
.....	**7**	.....	.....	**13**	**280**	**22**	**6**	**1**	.....	20	5	**54**
.....	1.65	.....	.....	3.06	**65.88**	5.18	1.41	.24	.....	4.71	1.17	**12.71**
.....	2.50	.....	.....	4.64	**100.00**	40.74	11.11	1.85	.....	37.04	9.26	**100.00**
.....	.09	.....	.....	.16	**3.50**	.28	.07	.01	.....	.25	.06	**.67**

NUMBER INJURED.

.....	11	.....	231	1,939	**9,389**	18	49	3	.....	50	115	**235**
.....	12	.....	151	875	**4,602**	18	57	2	3	59	53	**192**
6	29	.....	154	810	**6,565**	22	44	2	3	67	31	**169**
.....	13	1	81	697	**3,022**	14	76	.....	2	76	33	**201**
.....	1	.....	7	142	**556**	.....	3	.....	1	.....	11	**15**
6	**66**	**1**	**624**	**4,463**	**24,134**	**72**	**229**	**7**	**9**	**252**	**243**	**812**
.02	.20	(1)	1.92	13.71	**74.12**	.22	.70	.02	.03	.77	.75	**2.49**
.02	.27	(1)	2.59	18.49	**100.00**	8.87	28.20	.86	1.11	31.03	29.93	**100.00**
.07	.82	.01	7.78	55.64	**300.87**	.90	2.85	.09	.11	3.14	3.03	**10.12**

1911–1919.

247	38	53	4	121	**3,837**	348	131	23	20	271	101	**894**
4.25	.65	.91	.07	2.08	**65.99**	5.99	2.25	.40	.34	4.66	1.74	**15.38**
236	408	245	4,349	41,906	**249,160**	766	2,549	94	75	2,372	2,445	**8,301**
.07	.12	.08	1.34	12.90	**76.73**	.24	.79	.03	.02	.73	.75	**2.56**

[1] Less than one-tenth of 1 per cent.

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TABLE 17.—*ALL MINES: Fatalities and injuries, by causes*

NUMBER KILLED.

Kind of mine.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Copper	.....	1	.....	.....	.....	.....	1	.....	4	6
Gold, silver, and miscellaneous metal	2	.....	.....	.....	.....	.....	1	4	8	15
Iron	3	4	.....	.....	.....	.....	2	2	3	14
Lead and zinc (Mississippi Valley)	.....	.....	.....	1	.....	.....	.....	.....	2	3
Nonmetallic mineral	.....	4	1	1	.....	.....	3	3	3	15
Total, 1920	5	9	1	2	.....	.....	7	9	20	53
Percentage of grand total killed	1.17	2.11	.24	.47	.....	.....	1.65	2.11	4.71	12.47
Percentage of class total killed	9.43	16.98	1.89	3.77	.....	.....	13.21	16.98	37.74	100.00
Number killed per 1,000 300-day workers employed on the surface and in the pit	.14	.25	.03	.06	.....	.....	.19	.25	.55	1.47

NUMBER INJURED.

Copper	69	19	31	142	69	161	6	112	863	1,472
Gold, silver, and miscellaneous metal	98	17	12	95	52	131	13	99	318	835
Iron	91	96	20	175	89	214	22	123	498	1,328
Lead and zinc (Mississippi Valley)	16	8	7	31	45	50	3	67	156	383
Nonmetallic mineral	24	27	8	83	146	137	7	159	435	1,026
Total, 1920	298	167	78	526	401	693	51	560	2,270	5,044
Percentage of grand total injured	.91	.51	.24	1.62	1.23	2.13	.16	1.72	6.97	15.49
Percentage of class total injured	5.91	3.31	1.55	10.43	7.95	13.74	1.01	11.10	45.00	100.00
Number injured per 1,000 300-day workers employed on the surface and in the pit	8.24	4.61	2.16	14.54	11.09	19.16	1.41	15.48	62.76	139.45

1911-1919.

Fatalities, 1911 to 1919:										
Number (total United States)	50	59	19	62	3	3	45	71	186	498
Percentage of grand total.	.86	1.02	.33	1.07	.05	.05	.77	1.22	3.20	8.57
Injuries, 1911 to 1919:										
Number (total United States)	2,665	1,156	874	4,015	2,199	5,442	380	4,391	17,079	38,201
Percentage of grand total.	.82	.35	.27	1.24	.68	1.67	.12	1.35	5.26	11.76

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and kinds of mines, during the year ended Dec. 31, 1920—Continued.

NUMBER KILLED.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		1920
.....	6	7	1	.....	.....	.....	.....	.....	.....	1	15	128
.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	2	117
1	.....	1	2	1	.....	.....	.....	1	.....	.....	6	106
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36
3	6	.....	1	2	.....	.....	.....	1	.....	2	15	38
4	**13**	**8**	**5**	**3**	.....	.....	.....	**2**	.....	**3**	**38**	**425**
.94	3.06	1.88	1.17	.71	.....	.....	.....	.47	.....	.71	8.94	100.00
10.53	34.21	21.05	13.16	7.89	.....	.....	.....	5.27	.....	7.89	100.00	.....
.22	.72	.44	.27	.17	.....	.....	.....	.11	.....	.17	2.10	3.16

NUMBER INJURED.

83	24	70	72	66	3	.....	38	3	127	465	951	12,047
13	2	9	5	6	3	.....	2	.....	11	24	75	5,704
145	28	129	125	71	11	1	36	1	128	335	1,010	9,072
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3,607
38	36	59	20	28	5	.....	80	3	62	204	535	2,132
280	**90**	**267**	**222**	**171**	**22**	**1**	**156**	**7**	**328**	**1,028**	**2,572**	**32,562**
.86	.28	.82	.68	.52	.07	(1)	.48	.02	1.01	3.16	7.90	100.00
10.89	3.50	10.38	8.63	6.65	.85	.04	6.07	.27	12.75	39.97	100.00	.....
15.42	4.96	14.71	12.23	9.42	1.21	.05	8.59	.39	18.07	56.62	141.67	242.00

1911-1919.

153	131	156	19	24	8	1	31	18	.....	44	585	5,814
2.63	2.25	2.68	.33	.41	.14	.02	.53	.31	.....	.76	10.06	100.00
4,912	1,032	3,401	2,130	2,646	259	137	1,601	81	2,804	10,072	29,075	324,737
1.51	.32	1.05	.66	.82	.08	.04	.49	.02	.86	3.10	8.95	100.00

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TABLE 18.—*ALL MINES: Percentages of fatalities and injuries, by causes and kinds of mines, during the year ended Dec. 31, 1920.*

Causes.	Percentage killed.							Percentage injured.						
	Copper.	Gold, silver, and miscellaneous metal.	Iron.	Lead and zinc (Mississippi Valley).	Nonmetallic mineral.	Total. 1920	Total. 1919	Copper.	Gold, silver, and miscellaneous metal.	Iron.	Lead and zinc (Mississippi Valley).	Nonmetallic mineral.	Total. 1920	Total. 1919
Underground:														
1. Fall of rock or ore from roof or wall	36.72	28.21	39.62	36.11	7.89	32.47	35.04	20.34	17.36	15.88	10.23	3.24	16.33	19.67
2. Rock or ore while loading at working face or chute	1.56	1.71	3.77	2.78	.....	2.11	.86	10.32	10.08	12.75	23.62	3.99	12.01	11.19
3. Timber or hand tools	.78	.....	1.89	.....	.....	.71	.43	8.57	9.19	10.83	2.25	.70	8.09	8.11
4. Explosives	10.94	15.39	6.60	8.33	5.27	10.35	8.76	1.12	1.73	1.07	1.03	1.78	1.25	1.15
5. Haulage system (mine cars, mine locomotives, breakage of rope, etc.)	5.47	2.57	11.32	16.66	2.63	6.82	6.62	10.13	9.15	12.14	12.25	5.11	10.43	10.44
6. Falling down chute, winze, raise, or stope	5.47	7.69	1.89	.....	.....	4.24	6.41	2.27	3.86	1.47	1.30	.56	2.11	2.26
7. Run of ore from chute or pocket	1.56	.85	2.83	.....	.....	1.41	2.14	1.44	2.02	1.36	.66	.09	1.34	1.24
8. Drilling accidents (by machine or hand drills)	.....	.85	.94	.....	2.63	.71	.21	4.95	8.31	4.25	8.01	2.63	5.53	4.68
9. Electricity	1.56	4.27	.94	2.78	.....	2.11	2.14	.10	.19	.31	.25	.24	.20	.25
10. Machinery (other than locomotives or drills)	.....	.85	.....	.....	.....	.24	.21	.60	.59	1.29	2.22	.70	.98	.69
11. Mine fires	.....	.....	.....	.....	.....	.....	.86	.....	.....	.07	.....	.....	.02	.22
12. Suffocation from natural gases	1.56	3.42	.....	2.78	.....	1.65	.86	.09	.21	.32	.36	.05	.20	.23
13. Inrush of water	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.03	.....	(1)	.02
14. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	1.92	2.65	1.70	2.25	.33	1.92	1.71
15. Other causes	4.69	3.42	1.89	2.78	.....	3.06	1.49	16.09	15.34	8.93	19.32	6.66	13.71	14.01
Total underground	**70.31**	**69.23**	**71.70**	**72.22**	**18.42**	**65.88**	**66.03**	**77.94**	**80.68**	**72.37**	**83.78**	**26.08**	**74.12**	**75.87**
Shaft:														
16. Falling down shafts	4.69	6.84	4.72	8.33	.....	5.18	6.84	.15	.32	.24	.39	.....	.22	.22
17. Objects falling down shafts	2.34	.....	.94	5.55	.....	1.41	1.49	.41	1.00	.49	2.11	.14	.70	.66
18. Breaking of cables	.....	.85	.....	.....	.....	.24	.43	.02	.04	.02	.....	.....	.02	.06
19. Overwinding	.....	.....	.....	.....	.....	.....	1.71	.....	.05	.03	.05	.05	.03	.05
20. Skip, cage, or bucket	4.69	6.84	3.77	2.78	2.63	4.71	4.91	.42	1.03	.74	2.11	.....	.77	.85
21. Other causes	1.56	1.71	.....	2.78	.....	1.17	1.49	.95	.93	.34	.91	.52	.75	1.01
Total shaft	**13.28**	**16.24**	**9.43**	**19.45**	**2.63**	**12.71**	**16.88**	**1.95**	**3.37**	**1.86**	**5.57**	**.71**	**2.49**	**2.85**
Surface (at surface yards and shops):														
22. Mine cars or mine locomotives, gravity or aerial trams	.....	1.71	2.83	.....	.....	1.17	.43	.57	1.72	1.00	.44	1.12	.91	1.25
23. Railway cars and locomotives	.78	.....	3.77	.....	10.53	2.11	1.71	.16	.30	1.06	.22	1.27	.51	.47
24. Run or fall of ore in or from ore bins	.....	.....	.....	.....	2.63	.24	.43	.26	.21	.22	.19	.37	.24	.15
25. Falls of persons	.....	.....	.....	2.78	2.63	.47	2.35	1.18	1.66	1.93	.86	3.89	1.62	1.66
26. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	.57	.91	.98	1.25	6.85	1.23	.70

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27. Hand tools, axes, bars, etc.							.21	1.34	2.30	2.36	1.39	6.43	2.13	1.99
28. Electricity	.78	.85	1.89		7.89	1.65	1.07	.05	.23	.24	.08	.33	.16	.15
29. Machinery		3.42	1.89		7.89	2.11	.86	.93	1.73	1.36	1.86	7.46	1.72	1.64
30. Other causes	3.13	6.84	2.83	5.55	7.89	4.71	1.92	7.16	5.58	5.49	4.33	20.40	6.97	6.72
Total surface	**4.69**	**12.82**	**13.21**	**8.33**	**39.47**	**12.47**	**8.97**	**12.22**	**14.64**	**14.64**	**10.62**	**48.12**	**15.49**	**14.73**
Open pit:														
31. Falls or slides of rock or ore			.94		7.89	.94	3.42	.69	.23	1.60	.03	1.78	.86	.94
32. Explosives	4.69	.85			15.79	3.06	1.49	.20	.03	.31		1.69	.28	.15
33. Haulage system (cars, locomotives, etc.)	5.47		.94			1.88	1.28	.58	.16	1.42		2.77	.82	.78
34. Steam shovels	.78	.85	1.89		2.63	1.17	1.07	.60	.09	1.38		.94	.68	.75
35. Falls of persons			.94		5.27	.71	.43	.55	.10	.78		1.31	.52	.51
36. Falls of derricks, booms, etc								.02	.05	.12		.24	.07	.05
37. Run or fall of ore in or from ore bins										.01			(1)	.01
38. Machinery (other than locomotives or steam shovels)							.21	.32	.04	.40		3.75	.48	.24
39. Electricity			.94		2.63	.47	.21	.02		.01		.14	.02	.01
40. Hand tools								1.05	.19	1.41		2.91	1.01	.71
41. Other causes	.78				5.27	.71		3.86	.42	3.69		9.57	3.16	2.40
Total open pit	11.72	1.71	5.66		39.48	8.94	8.12	7.89	1.31	11.13	.03	25.10	7.90	6.55
Grand total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

[1] Less than one-tenth of 1 per cent.

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TABLE 19.—***ALL MINES:*** *Accidents during the year ended Dec. 31, 1920, by States and nature of injury.*

State.	Killed.	Seriously injured (time lost, more than 14 days).			Slightly injured (time lost, 1 to 14 days).
		Permanent total disability.[1]	Permanent partial disability.[2]	Others.	
Alabama	25	.....	12	477	1,059
Alaska	7	.....	.....	74	183
Arizona	52	2	24	1,562	4,787
Arkansas	2	.....	.....	18	67
California	26	.....	.....	473	665
Colorado	25	4	29	108	527
Connecticut	1	.....	.....	.....	1
Florida	17	.....	7	55	680
Georgia	.....	.....	.....	1	17
Idaho	12	.....	16	325	760
Illinois	5	1	15	16	63
Iowa	.....	.....	.....	15	36
Kansas	3	.....	7	94	312
Kentucky	.....	.....	1	10	31
Maine	.....	.....	1	.....	11
Maryland	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....
Michigan	49	4	35	1,457	3,800
Minnesota	42	.....	66	773	2,131
Missouri	12	.....	9	242	502
Montana	45	.....	9	513	1,991
Nevada	12	.....	9	156	429
New Hampshire[3]	.....	.....	.....	.....	.....
New Jersey	1	.....	.....	47	154
New Mexico	7	.....	3	127	522
New York	14	.....	16	155	1,012
North Carolina	1	.....	.....	2	31
Ohio	.....	.....	.....	8	59
Oklahoma	11	.....	28	263	1,338
Oregon	1	.....	2	13	111
Pennsylvania	.....	.....	.....	16	.....
South Carolina[3]	.....	.....	.....	.....	.....
South Dakota	5	.....	1	72	395
Tennessee	5	.....	6	162	673
Texas	6	.....	7	58	370
Utah	27	.....	23	423	1,070
Vermont	2	.....	1	2	15
Virginia	1	.....	.....	28	53
Washington	3	1	10	14	54
Wisconsin	5	.....	6	108	336
Wyoming	.....	.....	.....	7	22
Other States	1	.....	2	20	44
Total	**425**	**12**	**345**	**[4] 7,894**	**24,311**

[1] *Permanent total disability.*—Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] *Permanent partial disability.*—Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] Not segregated.

[4] The 7,894 "Other serious injuries" include 7 cases of total disability and 100 cases of partial disability which have not been segregated.

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TABLE 20.—***ALL MINES:*** *Accidents during the year ended Dec. 31, 1920, by causes and nature of injury.*

Cause.	Killed.	Seriously injured (time lost, more than 14 days).			Slightly injured (time lost, 1 to 14 days).
		Permanent total disability.[1]	Permanent partial disability.[2]	Others.	
Underground:					
Number killed or injured by—					
1. Fall of rock or ore from roof or wall	138	4	51	1,366	3,898
2. Rock or ore while loading at working face or chute	9	.....	18	821	3,073
3. Timber or hand tools	3	.....	10	624	2,001
4. Explosives	44	3	22	123	258
5. Haulage (mine cars, mine locomotives, breaking of rope, etc.)	29	.....	45	1,038	2,312
6. Persons falling down chute, winze, raise, or stope	18	1	9	232	443
7. Run of ore from chute or pocket	6	.....	3	125	309
8. Drilling (by machine or hand drills)	3	1	24	353	1,424
9. Electricity	9	.....	2	17	46
10. Machinery (other than locomotives or drills)	1	.....	9	95	214
11. Mine fires	.....	.....	.....	1	5
12. Suffocation from natural gases	7	.....	1	5	60
13. Inrush of water	.....	.....	.....	.....	1
14. Nails and splinters	.....	.....	2	107	515
15. Other causes	13	.....	14	1,016	3,433
Total number killed or injured underground	**280**	**9**	**210**	**5,923**	**17,992**
Shaft accidents:					
Number killed or injured by—					
16. Falling down shaft	22	.....	3	32	37
17. Objects falling down shaft	6	.....	4	68	157
18. Breaking of cables	1	.....	1	2	4
19. Overwinding	.....	.....	.....	2	7
20. Cage, skip, or bucket	20	.....	3	81	168
21. Other causes	5	.....	4	71	168
Total number killed or injured by shaft accidents	**54**	.....	**15**	**256**	**541**
Surface accidents (at surface yards and shops):					
Number killed or injured by—					
22. Mine cars or mine locomotives, gravity or aerial trams	5	1	5	88	204
23. Railway cars and locomotives	9	.....	4	61	102
24. Run or fall of ore in or from ore bins	1	.....	.....	15	63
25. Falls of persons	2	.....	4	193	329
26. Nails and splinters	.....	1	3	41	356
27. Hand tools, axes, bars, etc	.....	.....	5	137	551
28. Electricity	7	.....	.....	9	42
29. Machinery	9	.....	22	135	403
30. Other causes	20	1	19	499	1,751
Total number killed or injured by surface accidents	53	3	62	1,178	3,801
Open-pit accidents:					
Number killed or injured in pit by—					
31. Falls or slides of rock or ore	4	.....	2	87	191
32. Explosives	13	.....	11	24	55
33. Haulage (mine cars and locomotives, and railway cars, etc.)	8	.....	15	68	184
34. Steam shovels	5	.....	7	64	151
35. Falls of persons	3	.....	1	37	133
36. Falls of derricks, booms, etc	.....	.....	2	6	14
37. Run or fall of ore in or from ore bins	.....	.....	.....	.....	1
38. Machinery (other than locomotives or steam shovels)	.....	.....	8	27	121
39. Electricity	2	.....	.....	2	5
40. Hand tools	.....	.....	2	62	264
41. Other causes	3	.....	10	160	858
Total number killed or injured by open-pit accidents	**38**	.....	**58**	**537**	**1,977**
Grand total	**425**	**12**	**345**	[3] **7,894**	**24,311**

[1] *Permanent total disability.*—Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] *Permanent partial disability.*—Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] The 7,894 "Other serious injuries" include 7 cases of total disability and 100 cases of partial disability which have not been segregated.

Number of wives left widows, 180.

Number of children under 16 years of age left fatherless, 316.

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ACCIDENT RATES ON A UNIFORM TIME BASIS.

It has long been the practice of compilers of statistical reports to set forth the hazards of an industry by showing the relation which the number of persons killed or injured bears to the total number of persons employed. Frequently such accident rates are based upon the number of employees as reported, and do not take into consideration the length of time the men were exposed to the hazards of their occupations.

It is believed that the accident reports received by the Bureau of Mines from mine operators sometimes represent the total number of names on the pay roll or perhaps the number of persons employed on a certain day of the year. The number of names on the pay roll is usually much above the average number of men employed, because of the high labor turnover in the mining industry and the tendency of many miners to go from one mining district to another. The number of men at work on any given day of the year may be higher or lower than the average number employed, depending upon the season of the year and the conditions prevailing in the mining industry at the time. Hence both of these figures, if used alone, as a basis for calculating fatality and injury rates, will lead to erroneous conclusions being drawn.

In order to learn the real liability to accident to which mine employees are exposed, and to make fair comparisons one year with another, or one State with another, it is essential that the time element be considered. The reports should show the total number of days or shifts performed by all employees and the number of full days or full shifts the mine was in operation. Even more desirable would be a report of the number of hours of work actually performed. With this information as a basis the "average" number of employees may easily be calculated and accident rates made available that would be truly comparable.

Although there is little doubt that not all the operators' reports to the Bureau of Mines indicate the true "average" number of men at work, yet an effort has been made to determine the number of days of labor performed at all mines in the United States in order that the accident rates may be calculated upon a uniform time basis. Unless otherwise stated, therefore, all fatality and injury rates in this publication are based upon the number of full-time (300-day) workers.

ACCIDENTS CLASSIFIED BY MINING METHODS.

Accident hazards are not the same for all methods of mining. The methods vary with the type of ore-body being worked. Therefore, in order to show the variation of the accident hazards according to the different methods of mining, special tables have been prepared,

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which are presented in this report. These special tables do not cover all metal mines in the United States, but only those for which the reports received were reasonably complete in all details. They cover approximately half of all employees and half of the total number of shifts worked in the metal-mining industry.

Using these reports as a basis, the figures for 1920 represent the accident experience of 246 companies employing 61,742 men in actual mining operations, either underground or in open-pit mines. All employees in shops, yards, and elsewhere on the surface, and all accidents to such employees, have been omitted. The total shifts numbered 19,057,185, an average working time of 309 days for each employee.

A summary of the data for 1920 arranged according to the system of mining is given in Table 21.

Similar figures have been compiled since 1914 and the combined figures for seven years are given in Table 25. For the entire seven-year period the fatality rate of 4.87 per 1,000 full-time workers at mines working the room-and-pillar system is higher than for any other group. The nonfatal injury rate of 352.22 for the room-and-pillar system, was, however, exceeded by that for overhand stoping which was 367.57. As is to be expected, the accident rates for open-pit mines are considerably below those for underground work. Among the various underground methods of mining, the lowest fatality and injury rates were for mines using caving methods.

Operators' reports, grouped by mining methods.

Method of mining.	Number of operators.					
	1915	1916	1917	1918	1919	1920
Room and pillar	52	62	57	92	91	63
Overhand stoping:						
(*a*) With stulls	17	22	20	20	28	20
(*b*) With square sets, cribs, etc	31	32	31	39	47	32
(*c*) With filling	62	21	27	19	22	15
(*d*) Shrinkage	28	13	19	17	21	24
Underhand stoping	5	5	8	21	19	9
Caving methods	50	61	69	60	49	51
Open pit, with steam shovel	23	23	32	31	39	22
Open pit, without steam shovel	12	7	13	20	27	10
Total	280	246	276	319	343	246

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TABLE 21.—*Summary of metal-mine accident data, grouped by methods of mining, during the year ended Dec. 31, 1920.*

Method of mining.	Number companies represented.	Number States represented.	Days active.	Total days labor.	Number men employed in mines.	Number 300-day workers.	Number killed.		Number injured.	
							Total.	Per 1,000 300-day workers.	Total.	Per 1,000 300-day workers.
Room and pillar	63	21	299	3,167,189	10,590	10,557	45	4.26	3,278	310.50
Overhand stoping:										
(*a*) With stulls	20	11	305	768,530	2,519	2,562	11	4.29	829	323.58
(*b*) With square sets, cribs, etc	32	10	316	3,808,281	12,033	12,694	50	3.94	4,947	389.71
(*c*) With filling	15	9	319	905,081	2,833	3,017	19	6.30	811	268.81
(*d*) Shrinkage	24	12	312	780,873	2,503	2,603	11	4.23	685	263.16
Underhand stoping	9	15	311	1,168,476	3,759	3,895	13	3.34	1,392	357.38
Caving methods	51	7	306	5,454,859	17,838	18,183	55	3.02	6,138	337.57
Open pit, with steam shovel	22	10	310	2,768,130	8,933	9,227	16	1.73	1,376	149.13
Open pit, without steam shovel	10	8	321	235,766	734	786	1	1.27	84	106.87
Total, 1920	**246**	.....	**309**	**19,057,185**	**61,742**	**63,524**	**221**	**3.48**	**19,540**	**307.60**
Total, 1919	313	.....	304	18,323,004	60,283	61,007	253	4.14	18,130	296.84
Total, 1918	319	.....	307	22,838,062	74,510	76,127	349	4.58	24,582	322.91
Total, 1917	276	.....	304	24,808,172	81,611	82,694	328	3.97	26,340	318.52
Total, 1916	246	.....	307	21,496,327	69,997	71,653	291	4.06	28,576	398.82
Total, 1915	280	.....	303	22,842,999	75,365	76,140	324	4.25	27,314	358.73
Total, 1914	258	.....	292	22,004,824	75,453	73,349	361	4.92	24,306	331.38

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TABLE 22.—***FATALITIES,*** *classified by principal causes and mining methods, during the years ended Dec. 31, 1919 and 1920.*

Method of mining.	Number killed.																					Total.	
	By falls of rock.			By run or fall of ore while loading at chute, bin, or working face.			By explosives.			By haulage.			By falls of persons.			Miscellaneous.			In shaft.				
	1 and 31.[1]			2, 7, and 37.			4 and 32.			5 and 33.			6 and 35.			3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41.			16, 17, 18, 19, 20, and 21.				
	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Rate per 1,000 300-day workers.
1920.																							
Room and pillar	17	37.78	1.61	4	8.89	0.38	3	6.67	0.28	12	26.66	1.14	.....	.....	.....	3	6.67	0.28	6	13.33	0.57	**45**	4.26
Overhand stoping:																							
(*a*) With stulls	2	18.18	.78	1	9.09	.39	1	9.09	.39	1	9.09	.39	1	9.09	0.39	1	9.09	.39	4	36.37	1.56	**11**	4.29
(*b*) With square sets, cribs, etc	23	46.00	1.81	1	2.00	.08	4	8.00	.32	3	6.00	.24	5	10.00	.39	9	18.00	.71	5	10.00	.39	**50**	3.94
(*c*) With filling	12	63.16	3.98	.....	.....	.....	1	5.26	.33	1	5.26	.33	.....	.....	.....	.....	.....	.....	5	26.32	1.66	**19**	6.30
(*d*) Shrinkage	4	36.37	1.54	.....	.....	.....	2	18.18	.77	1	9.09	.38	1	9.09	.38	1	9.09	.38	2	18.18	.77	**11**	4.22
Underhand stoping	2	15.38	.52	.....	.....	.....	4	30.77	1.03	3	23.08	.77	2	15.38	.52	1	7.69	.25	1	7.69	.25	**13**	3.34
Caving methods	29	52.73	1.60	5	9.09	.27	4	7.27	.22	4	7.27	.22	.....	.....	.....	8	14.55	.44	5	9.09	.27	**55**	3.02
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	6	37.50	.65	3	18.75	.33	1	6.25	.11	6	37.50	.65	.....	.....	.....	**16**	1.74
Open pit, without steam shovel	1	100.00	1.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	**1**	1.27
Total, 1920	**90**	**40.72**	**1.42**	**11**	**4.98**	**.17**	**25**	**11.31**	**.39**	**28**	**12.67**	**.44**	**10**	**4.53**	**.16**	**29**	**13.12**	**.46**	**28**	**12.67**	**.44**	**221**	**3.48**
1919.																							
Room and pillar	23	48.94	2.14	.....	.....	.....	9	19.15	0.84	6	12.77	0.56	.....	.....	.....	3	6.38	0.28	6	12.77	0.56	**47**	4.38
Overhand stoping:																							
(*a*) With stulls	3	15.79	1.12	.....	.....	.....	1	5.26	.37	2	10.53	.74	.....	.....	.....	3	15.79	1.12	10	52.63	3.72	**19**	7.07
(*b*) With square sets, cribs, etc	22	42.31	1.70	2	3.84	0.16	3	5.77	.23	3	5.77	.23	7	13.46	0.54	6	11.54	.46	9	17.31	.70	**52**	4.02
(*c*) With filling	11	57.89	2.88	2	10.53	.52	.....	.....	.....	2	10.53	.52	2	10.53	.52	1	5.26	.26	1	5.26	.26	**19**	4.97
(*d*) Shrinkage	4	50.00	2.93	.....	.....	.....	1	12.50	.73	1	12.50	.73	.....	.....	.....	1	12.50	.73	1	12.50	.73	**8**	5.85
Underhand stoping	7	31.82	1.38	4	18.18	.79	2	9.09	.39	6	27.27	1.18	.....	.....	.....	.....	.....	.....	3	13.64	.59	**22**	4.33
Caving methods	40	59.70	2.32	3	4.48	.17	5	7.46	.29	6	8.96	.35	3	4.48	.17	2	2.98	.12	8	11.94	.46	**67**	3.88
Open pit, with steam shovel	4	26.67	.66	.....	.....	.....	1	6.67	.16	5	33.33	.83	2	13.33	.33	3	20.00	.50	.....	.....	.....	**15**	2.48
Open pit, without steam shovel	3	75.00	2.68	.....	.....	.....	1	25.00	.89	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	**4**	3.57
Total, 1919	**117**	**46.25**	**1.91**	**11**	**4.35**	**.18**	**23**	**9.09**	**.38**	**31**	**12.25**	**.51**	**14**	**5.53**	**.23**	**19**	**7.51**	**.31**	**38**	**15.02**	**.62**	**253**	**4.14**

[1] Numbers refer to causes as shown on Table 24 and other similar tables.

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TABLE 23.—*INJURIES, classified by principal causes and mining methods, during the years ended Dec. 31, 1919 and 1920.*

Method of mining.	Number injured.																					
	By falls of rock. 1 and 31.[1]			By run or fall of ore while loading at chute, bin, or working face. 2, 7, and 37.			By explosives. 4 and 32.			By haulage. 5 and 33.			By falls of persons. 6 and 35.			Miscellaneous. 3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41.			In shaft. 16, 17, 18, 19, 20, and 21.			Total.	
	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	**Number.**	Rate per 1,000 300-day workers.
1920.																						
Room and pillar	324	9.89	30.69	873	26.63	82.69	68	2.07	6.44	651	19.86	61.67	43	1.31	4.07	1,174	35.82	111.21	145	4.42	13.73	**3,278**	310.50
Overhand stoping:																						
(*a*) With stulls	159	19.18	62.06	170	20.51	66.36	9	1.08	3.51	102	12.30	39.81	59	7.12	23.03	318	38.36	124.12	12	1.45	4.68	**829**	323.57
(*b*) With square sets, cribs, etc.	1,236	24.98	97.37	573	11.58	45.14	43	.87	3.39	629	12.71	49.55	166	3.36	13.08	2,181	44.09	171.81	119	2.41	9.37	**4,947**	389.71
(*c*) With filling	205	25.28	67.95	187	23.06	61.98	4	.49	1.32	102	12.58	33.81	12	1.48	3.98	262	32.30	86.84	39	4.81	12.93	**811**	268.81
(*d*) Shrinkage	85	12.41	32.65	198	28.91	76.07	21	3.07	8.07	79	11.53	30.35	17	2.48	6.53	266	38.83	102.19	19	2.77	7.30	**685**	263.16
Underhand stoping	121	8.69	31.06	528	37.93	135.56	7	.50	1.80	273	19.61	70.09	32	2.30	8.21	421	30.25	108.09	10	.72	2.57	**1,392**	357.38
Caving methods	1,769	28.82	97.29	739	12.04	40.64	113	1.84	6.21	777	12.66	42.73	139	2.27	7.65	2,456	40.01	135.07	145	2.36	7.98	**6,138**	337.57
Open pit, with steam shovel	143	10.39	15.50	.....	.....	.....	27	1.96	2.93	128	9.30	13.87	93	6.76	10.08	985	71.59	106.75	.....	.....	.....	**1,376**	149.13
Open pit, without steam shovel	18	21.43	22.90	.....	.....	.....	3	3.57	3.82	7	8.33	8.90	3	3.57	3.82	53	63.10	67.43	.....	.....	.....	**84**	106.87
Total, 1920	**4,060**	**20.78**	**63.91**	**3,268**	**16.72**	**51.45**	**295**	**1.51**	**4.64**	**2,748**	**14.06**	**43.26**	**564**	**2.89**	**8.88**	**8,116**	**41.54**	**127.76**	**489**	**2.50**	**7.70**	**19,540**	**307.60**
1919.																						
Room and pillar	547	16.81	50.98	707	21.73	65.89	43	1.32	4.01	696	21.39	64.86	43	1.32	4.01	1,084	33.31	101.02	134	4.12	12.49	**3,254**	303.26
Overhand stoping:																						
(*a*) With stulls	199	33.06	74.09	51	8.47	18.99	2	.33	.74	98	16.28	36.48	20	3.32	7.45	212	35.22	78.93	20	3.32	7.45	**602**	224.13
(*b*) With square sets, cribs, etc	1,179	27.45	91.11	593	13.80	45.83	60	1.40	4.64	507	11.80	39.18	120	2.79	9.27	1,683	39.18	130.06	154	3.58	11.90	**4,296**	331.99
(*c*) With filling	275	21.20	71.97	238	18.35	62.29	4	.31	1.05	184	14.19	48.16	13	1.00	3.40	551	42.48	144.20	32	2.47	8.37	**1,297**	339.44
(*d*) Shrinkage	51	13.86	37.28	112	30.44	81.87	9	2.45	6.58	43	11.68	31.43	14	3.80	10.23	122	33.15	89.18	17	4.62	12.43	**368**	269.00
Underhand stoping	197	12.56	38.77	338	21.54	66.51	36	2.29	7.08	282	17.97	55.49	74	4.72	14.56	634	40.41	124.76	8	.51	1.57	**1,569**	308.74
Caving methods	1,777	32.07	102.81	600	10.83	34.71	86	1.55	4.98	657	11.86	38.01	139	2.51	8.04	2,157	38.94	124.79	124	2.24	7.17	**5,540**	320.51
Open pit, with steam shovel	144	13.38	23.82	2	.19	.33	25	2.32	4.14	130	12.08	21.51	71	6.60	11.75	704	65.43	116.45	.....	.....	.....	**1,076**	178.00
Open pit, without steam shovel	13	10.16	11.61	.....	.....	.....	7	5.47	6.25	5	3.90	4.46	26	20.31	23.21	77	60.16	68.75	.....	.....	.....	**128**	114.28
Total, 1919	**4,382**	**24.17**	**71.75**	**2,641**	**14.57**	**43.24**	**272**	**1.50**	**4.45**	**2,602**	**14.35**	**42.60**	**520**	**2.87**	**8.51**	**7,224**	**39.84**	**118.28**	**489**	**2.70**	**8.01**	**18,130**	**296.84**

[1] Numbers refer to causes as shown on Table 24 and other similar tables.

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TABLE 24.—*METAL MINE ACCIDENTS*

NUMBER KILLED.

Method of mining.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Room and pillar	17	3	.....	3	12	.....	1	.....	1	.....
Overhand stoping:										
(*a*) With stulls	2	.....	.....	1	1	1	1	.....	.....	.....
(*b*) With square sets, cribs, etc	23	1	.....	4	3	5	.....	.....	3	.....
(*c*) With filling	12	.....	.....	1	1	.....	.....	.....	.....	.....
(*d*) Shrinkage	4	.....	.....	2	1	1	.....	.....	.....	.....
Underhand stoping	2	.....	.....	4	3	2	.....	.....	.....	.....
Caving methods	29	2	3	4	4	.....	3	1	2	1
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**89**	**6**	**3**	**19**	**25**	**9**	**5**	**1**	**6**	**1**
Total, 1919	110	4	2	21	26	12	7	1	4	.....

NUMBER INJURED.

Room and pillar	324	762	118	68	651	43	111	311	7	59
Overhand stoping:										
(*a*) With stulls	159	164	55	9	102	59	6	55	1	12
(*b*) With square sets, cribs, etc	1,236	542	563	43	629	166	31	334	12	23
(*c*) With filling	205	152	87	4	102	12	35	45	1	6
(*d*) Shrinkage	85	162	48	21	79	17	36	98	.....	5
Underhand stoping	121	522	109	7	273	32	6	98	3	38
Caving methods	1,769	642	1,071	113	777	139	97	245	34	80
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1920	**3,899**	**2,946**	**2,051**	**265**	**2,613**	**468**	**322**	**1,186**	**58**	**223**
Total, 1919	4,225	2,367	1,835	240	2,467	423	272	897	64	159

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in 1920, by causes, grouped by mining methods.

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
.....	1	.....	.....	1	**39**	1	2	.....	.....	3	.....	**6**
.....	.....	.....	.....	1	**7**	1	.....	.....	.....	3	.....	**4**
.....	.....	.....	.....	6	**45**	1	.....	.....	.....	2	2	**5**
.....	.....	.....	.....	.....	**14**	2	2	.....	.....	1	.....	**5**
.....	.....	.....	.....	1	**9**	2	.....	.....	.....	.....	.....	**2**
.....	.....	.....	.....	1	**12**	.....	.....	.....	.....	.....	1	**1**
.....	.....	.....	.....	1	**50**	2	.....	.....	.....	3	.....	**5**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	**1**	.....	.....	**11**	**176**	**9**	**4**	.....	.....	**12**	**3**	**28**
2	1	.....	.....	6	**196**	11	5	2	8	11	1	**38**

NUMBER INJURED.

3	11	2	50	613	**3,133**	10	46	.....	2	58	29	**145**
.....	1	.....	13	181	**817**	1	2	.....	.....	3	6	**12**
.....	1	.....	157	1,091	**4,828**	6	17	2	.....	19	75	**119**
.....	.....	.....	5	118	**772**	5	10	.....	.....	9	15	**39**
.....	.....	.....	18	97	**666**	2	4	.....	.....	9	4	**19**
.....	.....	.....	26	147	**1,382**	.....	3	.....	.....	4	3	**10**
.....	37	.....	167	822	**5,993**	20	36	2	1	55	31	**145**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	**50**	**2**	**436**	**3,069**	**17,591**	**44**	**118**	**4**	**3**	**157**	**163**	**489**
44	36	6	312	3,090	**16,437**	24	110	14	9	155	177	**489**

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TABLE 24.—*METAL-MINE ACCIDENTS*

NUMBER KILLED.

Method of mining.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Room and pillar										
Overhand stoping										
(*a*) With stulls										
(*b*) With square sets, cribs, etc.										
(*c*) With filling										
(*d*) Shrinkage										
Underhand stoping										
Caving methods										
Open pit, with steam shovel										
Open pit, without steam shovel										
Total, 1920										
Total, 1919										

NUMBER INJURED.

Room and pillar										
Overhand stoping:										
(*a*) With stulls										
(*b*) With square sets, cribs, etc.										
(*c*) With filling										
(*d*) Shrinkage										
Underhand stoping										
Caving methods										
Open pit, with steam shovel										
Open pit, without steam shovel										
Total, 1920										
Total, 1919										

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in 1920, by causes, grouped by mining methods—Continued.

NUMBER KILLED.

Open pit.													
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.	
31	32	33	34	35	36	37	38	39	40	41		1920	1919
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	47
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	19
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	52
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	19
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55	67
.....	6	3	4	1	.....	.....	.....	1	.....	1	16	16	15
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	4
1	6	3	4	1	.....	.....	.....	1	.....	1	17	221	.....
7	2	5	3	2	.....	.....	.....	.....	.....	.....	19	.....	253

NUMBER INJURED.

.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,278	3,254
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	829	602
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,947	4,296
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	811	1,297
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	685	368
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,392	1,569
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,138	5,540
143	27	128	149	93	11	.....	49	1	183	592	1,376	1,376	1,076
18	3	7	4	3	.....	.....	2	1	5	41	84	84	128
161	30	135	153	96	11	.....	51	2	188	633	1,460	19,540	.....
157	32	135	161	97	12	2	36	2	131	439	1,204	.....	18,130

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TABLE 25.—*Accidents compared by mining methods and causes for the* ***seven-year period*** *1914 to 1920, inclusive.*

	Room and pillar.		Overhand stoping.		Underhand stoping.		Caving methods.		Open pit.			
									Steam shovel.		Without steam shovel.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Nonfatal injuries:												
Falls of rock (roof or bank)	3,160	13.96	19,613	24.89	713	8.42	13,188	29.79	2,289	16.78	237	24.36
Run or fall of rock or ore while loading	5,533	24.44	14,236	18.07	2,434	28.75	4,993	11.28	41	.30	7	.72
Explosives	358	1.58	867	1.10	319	3.77	755	1.70	370	2.71	44	4.52
Haulage	4,538	20.04	9,904	12.57	1,865	22.03	5,625	12.71	1,650	12.09	139	14.29
Falls of persons	375	1.66	2,573	3.26	185	2.19	1,027	2.32	1,122	8.22	67	6.88
Miscellaneous	7,615	33.64	29,527	37.47	2,852	33.69	17,494	39.52	8,173	59.90	479	49.23
Shaft	1,060	4.68	2,079	2.64	97	1.15	1,185	2.68	.....	.....	.....	.....
Total nonfatal injuries	**22,639**	**100.00**	**78,799**	**100.00**	**8,465**	**100.00**	**44,267**	**100.00**	**13,645**	**100.00**	**973**	**100.00**
Fatalities:												
Falls of rock (roof or bank)	143	45.69	397	40.93	38	36.90	253	46.08	38	21.84	11	57.89
Run or fall of rock or ore while loading	6	1.92	38	3.92	6	5.82	22	4.01	.....	.....	.....	.....
Explosives	51	16.29	83	8.56	14	13.59	50	9.11	36	20.69	3	15.79
Haulage	41	13.10	47	4.84	18	17.48	48	8.74	69	39.65	2	10.53
Falls of persons	7	2.24	85	8.76	3	2.91	36	6.56	4	2.30	2	10.53
Miscellaneous	14	4.47	109	11.24	6	5.82	56	10.20	27	15.52	1	5.26
Shaft	51	16.29	211	21.75	18	17.48	84	15.30	.....	.....	.....	.....
Total fatalities	**313**	**100.00**	**970**	**100.00**	**103**	**100.00**	**549**	**100.00**	**174**	**100.00**	**19**	**100.00**
Number of 300-day workers	64,276		214,377		24,509		132,049		63,255		8,098	
Nonfatal accident rate per 1,000 300-day workers	352.22		367.57		345.38		335.23		215.71		120.15	
Fatality rate per 1,000 300-day workers	4.87		4.52		4.20		4.16		2.75		2.35	

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ROOM-AND-PILLAR SYSTEM.

The room-and-pillar system of mining is peculiarly adapted to ore deposits that lie flat or nearly flat. The following table covering this system is based upon reports from 63 companies operating mines in 21 States and employing 10,590 men underground. A total of 3,167,189 shifts was worked, an average of 299 days per man. Table 21 shows that for every 300,000 shifts worked at this group of mines the fatality rate was 4.26 and the injury rate was 310.50. This fatality rate declined slightly from the record for 1919, but remained higher than the rate for any other system of mining except overhand stoping. The injury rate for 1920 was 310.50 per 1,000 300-day workers, as compared with 303.26 in 1919.

Number killed and injured in mines using ***room-and-pillar*** *method of mining during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	17	21	33	10	23	17	401	591	402	430	547	324
Run or fall of rock or ore in loading	.....	.....	1	.....	.....	4	746	998	734	749	707	873
Explosives	7	9	7	8	9	3	45	58	31	43	43	68
Haulage	.....	7	6	2	6	12	429	793	707	544	696	651
Falls of persons	1	2	2	.....	.....	.....	29	68	88	50	43	43
Miscellaneous	.....	2	2	.....	3	3	1,045	1,273	858	1,124	1,084	1,174
Shaft	2	6	10	18	6	6	124	232	133	211	134	145
Total	27	47	61	38	47	45	2,819	4,013	2,953	3,151	3,254	3,278
Per 1,000 300-day workers	3.97	5.59	6.00	4.11	4.38	4.26	413.95	477.17	290.68	341.20	303.26	310.50

OVERHAND STOPING.

Overhand stoping signifies the working of a block of ore upward, the ore being in the roof of the stope. This method of mining, which has many modifications, is widely used in mines where the ore body dips considerably. The data for 1920, as shown in Table 21, have been compiled from the reports of 91 operators employing 19,888 men underground for an average of 315 days. The number of underground days of labor performed was 6,262,765. For each 1,000 men employed (300-day workers) 4.36 men were killed and 348.34 men were injured. It may thus be seen that this system of mining resulted in a larger number of deaths than any other method. The nonfatal injury rate was also higher than for all other methods except underhand stoping.

Of the four different systems of overhand stoping, the highest fatality rate (6.30) per 1,000 employees was where filling methods were used, and the highest injury rate (389.71) was at mines using square sets, cribs, etc.

The following table summarizes for the past six years the combined figures for the four subdivisions of overhand stoping covered by the

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bureau's classification, namely, stulls, square sets and cribs, filling, and shrinkage methods:

*Number killed and injured in mines where **overhand stoping** was principal method used during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	89	51	48	51	40	41	3,579	3,431	3,370	2,784	1,704	1,685
Run or fall of rock or ore in loading	10	5	5	9	4	2	2,922	2,717	2,325	1,630	994	1,128
Explosives	16	10	15	12	5	8	134	204	161	91	75	77
Haulage	9	6	4	6	8	6	1,771	1,604	1,798	1,443	832	912
Falls of persons	21	5	12	6	9	7	519	354	347	376	167	254
Miscellaneous	13	16	17	33	11	11	6,391	4,525	4,688	4,051	2,568	3,027
Shaft	35	32	33	31	21	16	352	363	377	285	223	189
Total	193	125	134	148	98	91	15,668	13,198	13,066	10,660	6,563	7,272
Per 1,000 300-day workers	4.71	4.13	3.67	5.00	4.71	4.36	382.72	436.44	358.23	360.27	315.30	348.34

UNDERHAND STOPING.

Underhand stoping is used less extensively than other methods of underground mining. The reports for 1920 covering this system of mining have been compiled from the returns of nine companies operating mines in 15 States and employing 3,759 men. The average working time was 311 days, and the total number of shifts worked by underground employees was 1,168,476. The fatal accident rate for this method was lower than for room and pillar and for overhand stoping. The injury rate, however, was above that for all other methods.

*Number killed and injured in mines where **underhand stoping** was principal method used during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	7	3	13	6	7	2	53	95	77	170	197	121
Run or fall or rock or ore in loading	1	1	.....	.....	4	.....	248	524	402	394	338	528
Explosives	1	3	1	3	2	4	17	217	9	33	36	7
Haulage	1	2	3	3	6	3	329	365	395	221	282	273
Falls of persons	.....	1	.....	.....	.....	2	6	24	21	28	74	32
Miscellaneous	.....	1	.....	4	.....	1	312	459	475	551	634	421
Shaft	1	1	2	10	3	1	11	23	1	44	8	10
Total	11	12	19	26	22	13	976	1,707	1,380	1,441	1,569	1,392
Per 1,000 300-day workers	5.72	3.23	4.10	4.94	4.33	3.34	507.80	460.11	297.99	273.53	308.74	357.28

CAVING SYSTEMS.

The caving system is defined as "a method of mining in which the ore (the support of a great block being removed) is allowed to cave or fall, and in falling is broken sufficiently to be handled; the overlying strata subsides as the ore is withdrawn."[1] There are sev-

[1] Fay, A. H., A Glossary of the Mining and Mineral Industry, Bull. 95, U. S. Bureau of Mines. 1919. 754 pp.

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eral varieties of the system; those represented by the figures here presented being top slicing, substoping, block caving, etc., and the preliminary work that is necessary for any caving system. The tables for 1920 represent the reports of 51 companies that employed 17,838 men underground for 5,454,859 shifts, an average of 306 shifts per man. The fatality rate was 3.02 for every 300,000 shifts as compared with 3.88 in 1919. The injury rate was 337.57, which was above that for room-and-pillar work but lower than for overhand and underhand stoping. The principal causes of accidents are indicated in the accompanying table:

*Number killed and injured in mines using the **caving** system of mining during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	34	34	36	38	40	29	1,879	1,962	1,841	1,915	1,777	1,769
Run or fall of rock or ore in loading	4	3	3	2	3	5	486	889	745	936	600	739
Explosives	8	13	6	7	5	4	66	173	100	138	86	113
Haulage	2	8	13	6	6	4	794	978	840	798	657	777
Falls of persons	8	7	8	4	3	.....	142	124	146	194	139	139
Miscellaneous	7	2	3	22	2	8	2,267	2,795	2,711	2,658	2,157	2,456
Shaft	4	13	16	13	8	5	167	213	162	174	124	145
Total	67	80	85	92	67	55	5,801	7,134	6,545	6,813	5,540	6,138
Per 1,000 300-day workers	3.79	3.92	4.28	4.69	3.88	3.02	328.13	349.71	329.84	347.55	320.51	337.57

OPEN-PIT MINING WITH STEAM SHOVEL.

The open-pit system of mining with steam shovels is represented by the reports of 22 companies operating in 10 States and employing 8,933 men in the pits (shop employees excluded). A total of 2,768,130 shifts was performed by the pit employees, an average of 310 days per man. The accident rates were 1.73 killed and 149.13 injured per 1,000 men employed. Both of these rates are the lowest on record during the past seven years. The following table shows the principal causes of accidents for this group of mines since 1915:

*Number killed and injured in **open-pit** mines where the ore was mined by steam shovel during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	4	5	9	11	4	.....	449	402	380	346	144	143
Run or fall of rock or ore in loading	.....	.....	.....	.....	.....	.....	8	9	17	5	2	.....
Explosives	1	7	4	9	1	6	38	41	75	57	25	27
Haulage	16	11	13	13	5	3	194	287	304	336	130	128
Falls of persons	.....	.....	.....	1	2	1	179	129	223	189	71	93
Miscellaneous	3	4	3	5	3	6	1,040	1,548	1,288	1,352	704	985
Shaft	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	24	27	29	39	15	16	1,908	2,416	2,287	2,285	1,076	1,376
Per 1,000 300-day workers	3.16	3.15	2.81	3.66	2.48	1.73	250.79	281.58	221.39	214.27	178.00	149.13

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OPEN-PIT MINING WITHOUT STEAM SHOVEL.

Accidents at open-pit mines where no steam shovels are used are usually less frequent than where other methods of mining are in operation, because machinery is not so extensively used and all work is performed by daylight, so that the workmen are free from many of the hazards incident to underground mining. The figures for 1920 for this system of mining are based upon the reports of 10 companies in eight States which employed 734 men in the pits. These men worked 235,766 shifts, an average of 321 days per man. The fatality rate was 1.27 and the injury rate was 106.87, both rates being lower than those for 1919 or 1918. The following table shows the accidents by principal causes:

Number killed and injured in ***open-pit*** *mines where no steam shovels were used during the calendar years 1915 to 1920.*

Cause.	Killed.						Injured.					
	1915	1916	1917	1918	1919	1920	1915	1916	1917	1918	1919	1920
Fall of rock	1	.....	.....	2	3	1	16	26	24	81	13	18
Run or fall of rock or ore in loading	.....	.....	.....	.....	.....	.....	1	3	.....	.....	.....	.....
Explosives	.....	.....	.....	2	1	.....	1	5	16	7	7	3
Haulage	.....	.....	.....	1	.....	.....	22	34	21	22	5	7
Falls of persons	1	.....	.....	1	.....	.....	9	2	2	14	26	3
Miscellaneous	1	.....	.....	.....	.....	.....	93	38	46	108	77	53
Shaft	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	3	0	0	6	4	1	142	108	109	232	128	84
Per 1,000 300-day workers	2.54	.....	.....	3.39	3.57	1.27	120.03	348.39	86.71	131.15	114.28	106.87

ACCIDENTS IN MINERAL INDUSTRIES.

Table 26 has been prepared to show the comparative accident rates for 1920 in all branches of the mineral industry for which statistics are compiled by the Bureau of Mines. Complete data for coal mines are not available, because the number of persons working in 1920 has not yet been fully reported to the United States Geological Survey by mine operators and reports of nonfatal injuries are not received by the Bureau of Mines. For all other branches of the industry, however, the highest fatality rate was for gold, silver, and miscellaneous metal mines, a group that includes all metal mines except those producing iron or copper and those in the Mississippi Valley that produce lead and zinc. The highest injury rate was for the lead and zinc mines of the Mississippi Valley. Sandstone and bluestone quarries had the lowest fatality rate, while the lowest injury rate was for marble quarries. It should be stated that the low accident rates at quarries are largely explained by the fact that work is usually conducted above ground and by daylight, and the

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workmen are thus free from many of the dangers incident to underground mining.

Table 27 indicates the percentage of deaths due to each of the chief causes of accidents at coal mines, metal mines, and quarries. During the ten years covered by the table most of the fatal accidents at coal mines were caused by falls of roof or side, the use of haulage equipment, gas and coal-dust explosions, and explosives. At metal mines the principal causes of fatalities have been falls of rock or ore, falls of persons, the use of explosives, and haulage equipment. Fatal accidents at quarries were mainly due to haulage equipment, falls or slides of rock or overburden, explosives, and machinery.

TABLE 26.—*Fatality and injury rates in different branches of mineral industries in 1920, compared on a 300-day basis.*

[Length of shift not considered.]

Branch of mineral industry.	Average days active.	Men employed.		Days of labor performed.	Killed.	Number killed per 1,000 300-day workers.	Injured.	Number injured per 1,000 300-day workers.
		Actual number.	Equivalent in 300-day workers (calculated).					
All metal mines	296	136,583	134,540	40,361,893	425	3.16	32,562	242.02
Copper mines	317	35,254	37,274	11,182,119	128	3.43	12,047	323.20
Gold and miscellaneous metal mines	279	29,933	27,849	8,354,830	117	4.20	5,704	204.82
Iron mines	295	45,990	45,249	13,574,788	106	2.34	9,072	200.49
Lead and zinc mines (Mississippi Valley)	283	11,638	10,998	3,299,278	36	3.27	3,607	327.97
Nonmetallic mineral mines	287	13,768	13,170	3,950,878	38	2.89	2,132	161.88
Coal mines [1]	.....	.....	.....	.....	2,260	.....	.....	.....
All quarries (including outside works)	267	86,488	77,089	23,126,648	178	2.31	11,217	145.51
Cement rock quarries	309	13,251	14,165	3,017,582	39	2.75	2,585	182.49
Granite quarries	251	12,735	10,664	3,199,073	22	2.06	1,392	130.53
Limestone quarries	259	43,151	37,182	11,154,653	96	2.58	5,321	143.11
Marble quarries	277	4,438	4,349	851,907	4	.92	400	91.98
Sandstone and bluestone quarries	238	4,466	3,540	1,062,161	2	.56	356	100.56
Slate quarries	295	3,496	3,364	243,915	5	1.49	364	108.20
Trap-rock quarries	231	4,951	3,825	370,218	10	2.61	799	208.89
All quarries (excluding outside works)	255	53,642	45,617	13,685,149	128	2.81	6,369	139.62
All quarries (outside works only)	287	32,846	31,472	9,441,499	50	1.59	4,848	154.04
Metallurgical works:								
Ore-dressing plants	300	15,959	15,977	4,793,151	21	1.31	2,624	164.24
Smelters	350	24,944	29,137	8,741,116	20	.69	4,147	142.33
Auxiliary works	337	16,005	18,005	5,401,641	20	1.11	2,092	116.19
Coke ovens	319	28,139	29,921	8,976,214	49	1.64	3,415	114.13
Beehive coke ovens	276	10,955	10,094	3,028,062	11	1.09	1,035	102.54
By-product coke ovens	346	17,184	19,827	5,948,152	38	1.92	2,380	120.04
Total, 1920	.....	.....	.....	.....	**2,973**	.....	.....	.....
Total, 1919	230	1,086,264	831,851	249,978,614	3,023	3.63	(2)	.....

[1] Not available except for number of fatalities.

[2] Injuries for coal mines not available.

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TABLE 27.—***METAL MINES, COAL MINES, AND QUARRIES:*** *Principal causes of fatalities, showing percentage due to each cause, 1911 to 1920, by years.*

Industry.	Cause of death.								Total.
	Falls of overburden, roof, quarry material, ore, or coal.	Explosives.	Haulage and handling rock, ore, or coal.	Falls of persons.	Electricity.	Machinery.	Gas and dust explosions.	Other causes.	
1911:									
Metal mines	**32.52**	**11.22**	**7.63**	**15.39**	**2.45**	**3.16**	.....	**27.63**	**100.00**
Coal mines	47.40	6.02	17.13	1.28	3.73	1.51	13.74	9.19	100.00
Quarries	25.53	26.60	20.21	8.51	1.07	9.04	.....	9.04	100.00
1912:									
Metal mines	**34.49**	**14.22**	**10.28**	**13.92**	**3.78**	**3.78**	.....	**19.52**	**100.00**
Coal mines	49.03	6.08	19.14	1.36	3.64	1.65	11.99	7.11	100.00
Quarries	17.37	22.06	27.70	8.92	1.87	11.74	.....	10.33	100.00
1913:									
Metal mines	**34.70**	**13.03**	**12.88**	**12.30**	**3.81**	**4.39**	.....	**18.89**	**100.00**
Coal mines	45.39	4.95	18.31	1.80	3.16	1.80	18.45	6.14	100.00
Quarries	14.75	24.04	23.50	9.29	2.73	12.57	.....	13.12	100.00
1914:									
Metal mines	**36.32**	**10.73**	**10.20**	**16.10**	**3.04**	**2.50**	.....	**21.11**	**100.00**
Coal mines	46.09	5.95	18.79	2.85	4.07	1.87	14.22	6.16	100.00
Quarries	29.45	19.44	18.33	12.78	1.67	6.11	.....	12.22	100.00
1915:									
Metal mines	**36.71**	**14.10**	**10.49**	**15.91**	**2.53**	**1.99**	.....	**18.26**	**100.00**
Coal mines	47.55	6.83	18.64	1.37	4.36	1.68	13.40	6.17	100.00
Quarries	30.40	18.92	15.55	11.48	2.03	9.46	.....	12.16	100.00
1916:									
Metal mines	**32.28**	**12.77**	**10.04**	**14.64**	**3.73**	**2.58**	.....	**23.96**	**100.00**
Coal mines	47.84	6.56	20.89	1.39	4.36	1.89	10.15	6.92	100.00
Quarries	19.08	16.18	19.66	8.09	4.05	16.76	.....	16.18	100.00
1917:									
Metal mines	**26.17**	**9.27**	**10.33**	**13.15**	**2.23**	**2.00**	.....	**36.85**	**100.00**
Coal mines	45.18	4.12	22.11	.96	3.52	2.34	13.43	8.34	100.00
Quarries	18.32	16.03	24.43	11.45	1.52	15.27	.....	12.98	100.00
1918:									
Metal mines	**29.72**	**13.78**	**13.00**	**12.85**	**3.87**	**3.25**	.....	**23.53**	**100.00**
Coal mines	50.13	5.24	24.20	.81	3.99	2.21	5.01	8.41	100.00
Quarries	14.40	13.60	24.80	12.00	3.20	14.40	.....	17.60	100.00
1919:									
Metal mines	**38.46**	**10.26**	**10.90**	**16.02**	**3.42**	**4.27**	.....	**16.67**	**100.00**
Coal mines	47.48	8.89	20.37	.86	3.41	2.07	8.24	8.68	100.00
Quarries	12.19	19.51	25.20	6.51	4.07	16.25	.....	16.27	100.00
1920:									
Metal mines	**33.41**	**13.41**	**14.11**	**10.59**	**4.24**	**4.24**	.....	**20.00**	**100.00**
Coal mines	49.87	5.62	21.37	1.19	4.11	2.70	7.26	7.88	100.00
Quarries	18.54	20.23	25.84	7.30	3.93	11.80	.....	12.36	100.00

FATALITIES DUE TO EXPLOSIVES.

In the number of fatalities caused by explosives, the quarrying industry shows a higher accident rate than either metal mines or coal mines. The following table shows the percentage of fatalities due to explosives since 1911 in the mining and quarrying industry.

TABLE 28.—*Fatalities, due to explosives, at mines and quarries in the United States.*

Year.	Metal mines.		Quarries.		Coal mines.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
1911	78	11.22	50	26.60	160	6.02
1912	94	14.22	47	22.06	147	6.08
1913	89	13.03	44	24.04	138	4.95
1914	60	10.73	35	19.44	146	5.95
1915	78	14.10	28	18.92	155	6.83
1916	89	12.77	28	16.18	146	6.56
1917	79	9.27	21	16.03	111	4.12
1918	89	13.78	17	13.60	135	5.24
1919	48	10.26	24	19.51	206	8.89
1920	**57**	**13.41**	**36**	**20.22**	**127**	**5.62**

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PRODUCTION, DISTRIBUTION, AND USE OF EXPLOSIVES.[1]

The mining industry is by far the largest consumer of explosives in the United States. In 1920, out of a total of 538 million pounds of explosives used in this country, 404 million pounds (75 per cent) were used in mining operations. Of this consumption, 228 million pounds were black powder, representing 89.6 per cent of the total production of this class of explosives; 54 million pounds were permissible explosives, representing 90.7 per cent of the permissible class; and 49 million pounds were other high explosives, representing 55.2 per cent.

Table 29 shows the percentage of each class of explosives used in the mining industry for each year since 1915.

TABLE 29.—*Percentage of explosives used for various purposes in the United States, 1915 to 1920.*

	Coal mining.	Other mining.	Railway and other construction work.	All other purposes.	Total.
1920.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Black powder	86.2	3.4	1.9	8.5	100.00
High explosives	16.3	38.9	6.6	38.2	100.00
Permissible explosives	83.8	6.9	.5	8.8	100.00
Total	**56.2**	**18.9**	**3.7**	**21.2**	**100.00**
1919.					
Black powder	85.0	3.5	2.8	8.7	100.0
High explosives	14.9	45.3	6.4	33.4	100.0
Permissible explosives	84.5	6.4	.5	8.6	100.0
Total	**51.7**	**23.6**	**4.3**	**20.4**	**100.0**
1918.					
Black powder	87.7	3.0	2.2	7.1	100.0
High explosives	15.2	49.6	5.8	29.4	100.0
Permissible explosives	80.9	9.9	.4	8.8	100.0
Total	**57.1**	**22.9**	**3.5**	**16.5**	**100.0**
1917.					
Black powder	85.1	3.4	4.7	6.8	100.0
High explosives	10.8	50.4	7.8	31.0	100.0
Permissible explosives	76.5	14.2	.2	9.1	100.0
Total	**51.0**	**25.4**	**5.7**	**17.9**	**100.0**
1916.					
Black powder	82.1	3.6	5.0	9.3	100.0
High explosives	8.2	51.6	8.6	31.6	100.0
Permissible explosives	76.6	17.9	.3	5.2	100.0
Total	**44.4**	**28.8**	**6.5**	**20.3**	**100.0**
1915.					
Black powder	84.8	3.4	3.6	8.2	100.0
High explosives	9.5	46.3	9.4	34.9	100.0
Permissible explosives	79.9	17.1	.5	2.5	100.0
Total	**45.9**	**26.1**	**6.4**	**21.5**	**99.9**

ACCIDENTS AT METALLURGICAL PLANTS DURING 1920.

Table 30 shows the number of men employed, number killed and injured at ore-dressing plants, smelting plants, and auxiliary works, by States, for the calendar year 1920.

[1] Adams, W. W., Production of explosives in the United States, 1920: Tech. Paper 291, Bureau of Mines, 1921, 44 pp.

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TABLE 30.—***METALLURGICAL WORKS:*** *Labor and accident statistics for the year ended Dec. 31, 1920.*[1]

State.	Ore-dressing plants.[2]			Smelting plants.[3]			Auxiliary works.[4]		
	Men employed.	Killed.	Injured.	Men employed.	Killed.	Injured.	Men employed.	Killed.	Injured.
Alabama	194	1	9	.....	.....	.....	30	.....	10
Alaska	459	1	49	.....	.....	.....	50	1	1
Arizona	1,812	1	314	2,593	3	687	1,414	1	200
Arkansas	143	.....	29	440	1	84	173	.....	46
California	508	3	114	333	.....	37	383	.....	39
Colorado	1,027	3	120	1,371	2	165	487	.....	89
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	512	1	51	(5)	.....	.....	170	.....	13
Illinois	121	1	16	2,433	3	433	1,371	.....	228
Kansas	209	.....	42	852	.....	141	17	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	1,418	1	144	585	.....	107	(5)	.....	.....
Minnesota	556	.....	19	.....	.....	.....	.....	.....	.....
Missouri	795	2	130	1,053	.....	427	814	.....	356
Montana	1,122	1	104	1,214	2	151	2,845	6	176
Nevada	889	2	181	672	.....	132	170	.....	6
New Jersey	511	.....	26	2,650	.....	377	2,035	.....	157
New Mexico	558	2	79	(5)	.....	.....	369	.....	74
New York	911	.....	158	(5)	.....	.....	247	.....	48
North Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	166	.....	335	704	.....	265	251	1	127
Oregon	48	.....	22	.....	.....	.....	6	.....	.....
Pennsylvania	90	.....	24	2,955	.....	374	1,986	4	144
South Dakota	248	.....	20	.....	.....	.....	.....	.....	.....
Tennessee	366	.....	40	(5)	.....	.....	813	4	170
Texas	(5)	.....	.....	674	.....	39	(5)	.....	.....
Utah	1,064	1	276	1,775	3	163	1,140	.....	28
Vermont	134	.....	15	.....	.....	.....	26	.....	18
Virginia	599	.....	16	(5)	.....	.....	108	.....	7
Washington	177	.....	5	776	.....	77	329	1	25
West Virginia	.....	.....	.....	640	.....	91	301	.....	58
Wisconsin	166	.....	54	151	.....	26	93	1	15
Other States	1,156	1	232	3,073	6	371	377	1	57
Total, 1920	**15,959**	**21**	**2,624**	**24,944**	**20**	**4,147**	**16,005**	**20**	**2,092**
Total, 300-day workers	15,977	.....	.....	29,137	.....	.....	18,005	.....	.....
Fatality and injury rates	.....	1.31	164.24	.....	.69	142.33	.....	1.11	116.19
Total, 1919	17,262	25	2,057	28,777	34	4,431	15,081	5	1,638
Total 300-day workers	16,862	.....	.....	31,324	.....	.....	16,172	.....	.....
Fatality and injury rates	.....	1.48	122.21	.....	1.09	141.46	.....	.31	101.29

[1] Adams, W. W., Accidents at Metallurgical Plants, 1920; Tech. Paper 297, Bureau of Mines, 1921, 28 pp.
[2] Stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide and flotation mills.
[3] Blast, reverberatory, and roasting furnaces; converters, casting department, and refineries.
[4] Yards, shops, construction, etc.
[5] Included in "Other States."

DETAILS RELATING TO CHIEF CAUSES OF ACCIDENTS.

The metal-mine accidents covered by this publication have been classified by causes into 41 main groups. It is frequently found necessary, however, to obtain more detailed information on certain classes of accidents than is afforded by such a general classification. Therefore, in order to obtain additional data regarding accidents such as those attributed generally to "explosives," "electricity," etc., a special and more elaborate report card was prepared in 1916 by the Bureau of Mines. Copies of these cards were mailed to several hundred mining companies with the suggestion that, if possible, the companies use the special form for reporting accidents in lieu of the more condensed classification card in general use by the bureau. As a result of the bureau's suggestion, a representative number of operators have, during the past few years, been rendering annual

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reports of mine accidents in accordance with the more detailed classification of causes. With these special reports as a basis, Tables 31, 32, and 33 have been compiled covering the three-year period 1918–1920. The number of mine operators represented was 135 in 1918, 109 in 1919, and 106 in 1920.

From these tables it may be noted that of the total number of underground accidents due to explosives, premature shots caused more than 40 per cent of the deaths and about 10 per cent of the injuries. Eight and one-half per cent of the fatalities and 9.8 per cent of the injuries were caused by the miner returning too soon to his working place.

TABLE 31.—*Summary of accidents and labor statistics compiled from* ***SELECTED*** *representative returns.*

	1918	1919	1920	Total.	Total and average 1911–1920.
Active operators	135	109	106	350	[1] 46,908
Average days active:					
Underground	317	299	309	309	289
Open pit	322	281	306	305	[2]
Surface	320	290	318	309	278
Total	**318**	**296**	**311**	**309**	**285**
Men employed (actual number):					
Underground	39,620	30,183	27,790	97,593	1,085,291
Open pit	4,867	3,698	3,457	12,022	[2]
Surface	11,540	10,955	10,690	33,185	[3] 621,111
Total	**56,027**	**44,836**	**41,937**	**142,800**	**1,706,402**
Men employed (300-day workers):					
Underground	41,921	30,098	28,616	100,636	1,044,588
Open pit	5,221	3,468	3,523	12,212	[2]
Surface	12,292	10,607	11,319	34,218	[3] 576,331
Total	**59,434**	**44,173**	**43,458**	**147,066**	**1,620,919**
Days of labor:					
Underground	12,576,294	9,029,525	8,584,833	30,190,652	313,375,515
Open pit	1,566,286	1,040,260	1,056,960	3,663,506	[2]
Surface	3,687,578	3,182,245	3,395,718	10,265,541	172,899,505
Total	**17,830,158**	**13,252,030**	**13,037,511**	**44,119,699**	**486,275,020**
Killed:					
Underground	158	123	92	373	5,065
Open pit	25	7	9	41	[2]
Surface	16	8	6	30	1,174
Total	**199**	**138**	**107**	**444**	**6,239**
Injured:					
Underground	15,644	10,301	10,262	36,207	282,407
Open pit	1,398	833	789	3,020	[2]
Surface	2,055	1,533	1,659	5,247	74,892
Total	**19,097**	**12,667**	**12,710**	**44,474**	**357,299**
Killed per 1,000 300-day workers:					
Underground	3.77	4.09	3.21	3.71	4.85
Open pit	4.79	2.02	2.55	3.36	[2]
Surface	1.30	.75	.53	.88	2.04
Total	**3.35**	**3.12**	**2.46**	**3.02**	**3.85**
Injured per 1,000 300-day workers:					
Underground	373.18	342.25	358.61	359.78	270.35
Open pit	267.76	240.20	223.96	247.30	[2]
Surface	167.18	144.53	146.57	153.34	129.95
Total	**321.31**	**286.76**	**292.47**	**302.41**	**220.43**

[1] Average number operators reporting each year, 4,690. [2] Included in surface. [3] Includes open pit.

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In like manner the tables indicate the percentage of accidents due to each cause under the general headings "handling rock or ore," "haulage," "electricity," and "other causes." The percentages for the combined three-year period have been used as a basis for segregating by causes all metal-mine accidents reported to the Bureau of Mines since 1911. The resulting figures are shown in the last column of Tables 32 and 33.

TABLE 32.—***FATALITIES AT METAL MINES,*** *with principal causes subdivided.*

[Selected returns.]

	Fatalities.				Group totals, per cent.	Total fatalities, 1911–1920.[1]
	1918	1919	1920	Total.		
UNDERGROUND.						
Number killed by—						
1. Falls of rock or ore from roof or wall	63	63	42	168	.....	1,902
2. Handling rock or ore	.....	.....	.....	.....	.....	80
(*a*) Loading at face	1	.....	.....	1	33.33	*27*
(*b*) Loading at chute	1	.....	1	2	66.67	*53*
(*c*) Sledging	.....	.....	.....	.....	.....	.....
3. Timber or hand tools	1	.....	1	2	.....	47
4. Explosives	.....	.....	.....	.....	.....	617
(*a*) Transportation	.....	.....	.....	.....	.....	.....
(*b*) Charging	1	.....	.....	1	2.86	*18*
(*c*) Suffocation	.....	2	.....	2	5.71	*35*
(*d*) Drilling into old holes	3	.....	.....	3	8.57	*53*
(*e*) Striking in loose rock or ore	2	.....	.....	2	5.71	*35*
(*f*) Thawing	.....	.....	.....	.....	.....	.....
(*g*) Caps, detonators, etc	.....	.....	1	1	2.86	*18*
(*h*) Unguarded shots	.....	.....	2	2	5.71	*35*
(*i*) Returned too soon	.....	3	.....	3	8.57	*53*
(*j*) Premature shot	8	5	1	14	40.00	*247*
(*k*) Miscellaneous	4	1	2	7	20.00	*123*
5. Haulage	.....	.....	.....	.....	.....	310
(*a*) Hand and animal	1	2	.....	3	6.25	*19*
(*b*) Mechanical	21	11	13	45	93.75	*291*
6. Persons falling down chute, winze, raise, or stope	3	5	5	13	.....	417
7. Run of ore from chute or pocket	2	6	1	9	.....	89
8. Drilling (by machine or hand drills)	.....	.....	1	1	.....	16
9. Electricity	.....	.....	.....	.....	.....	131
(*a*) Direct contact with trolley wire	2	1	3	6	50.00	*66*
(*b*) Tool or bar striking trolley wire	.....	.....	.....	.....	.....	.....
(*c*) Contact with motor	.....	1	.....	1	8.33	*11*
(*d*) Others	2	1	2	5	41.67	*54*
10. Machinery other than 5 and 8	.....	.....	.....	.....	.....	25
11. Mine fires	3	2	.....	5	.....	247
12. Suffocation from natural gases	.....	1	.....	1	.....	45
13. Inrush of water	2	.....	.....	2	.....	53
14. Nails and splinters	1	.....	.....	1	.....	4
15. Other causes	.....	.....	.....	.....	.....	134
(*a*) Falling objects, other than 1 and 2	8	1	4	13	68.42	*92*
(*b*) Flying objects, other than 2 c	.....	.....	.....	.....	.....	.....
(*c*) Burns	.....	.....	.....	.....	.....	.....
(*d*) Miscellaneous	2	1	3	6	31.58	*42*
Total number killed underground	**131**	**106**	**82**	**319**	**71.85**	**4,117**
SHAFT ACCIDENTS.						
Number killed by—						
16. Falling down shafts	6	3	4	13	.....	370
17. Objects falling down shafts	1	.....	1	2	.....	137
18. Breaking of cables	2	2	.....	4	.....	24
19. Overwinding	1	3	.....	4	.....	20
20. Cage, skip, or bucket	.....	.....	.....	.....	.....	291
(*a*) Runaway	.....	1	.....	1	5.00	*15*
(*b*) Riding with rock or ore	1	.....	.....	1	5.00	*15*
(*c*) Riding with timber or tools	3	1	1	5	25.00	*72*
(*d*) Struck by	5	5	3	13	65.00	*189*
21. Other causes	8	2	1	11	.....	106
Total number killed by shaft accidents	**27**	**17**	**10**	**54**	**12.16**	**948**

[1] All figures in italics are calculated on basis of percentage in preceding column.

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TABLE 32.—***FATALITIES AT METAL MINES,*** *with principal causes subdivided*—Continued.

	Fatalities.				Group totals, per cent.	Total fatalities, 1911–1920.[1]
	1918	1919	1920	Total.		
SURFACE ACCIDENTS.						
(At surface plants and shops.)						
Number killed by—						
22. Haulage						55
(*a*) Hand and animal	2			2	40.00	*22*
(*b*) Mechanical	2	1		3	60.00	*33*
23. Railway cars and locomotives	1	1	2	4		68
24. Run or fall of ore in or from ore bins		1		1		20
25. Falls of persons		1		1		64
26. Nails and splinters						3
27. Hand tools, axes, bars, etc						3
28. Electricity						52
(*a*) Direct contact with trolley wire	1		1	2	40.00	*21*
(*b*) Tool or bar striking trolley wire						
(*c*) Contact with motor	1			1	20.00	*10*
(*d*) Others	2			2	40.00	*21*
29. Machinery	2	2	1	5		80
30. Other causes						206
(*a*) Falling objects	3			3	33.33	*69*
(*b*) Flying objects	1			1	11.11	*23*
(*c*) Burns	1	1	1	3	33.33	*69*
(*d*) Miscellaneous		1	1	2	22.22	*45*
Total number killed by surface accidents.	**16**	**8**	**6**	**30**	**6.76**	**551**
OPEN-PIT ACCIDENTS.						
Number killed in pit by—						
31. Falls or slides of rock or ore	8	2		10		157
32. Explosives						144
(*a*) Transportation						
(*b*) Charging	3		1	4	30.77	*44*
(*c*) Suffocation						
(*d*) Drilling into old holes						
(*e*) Striking in loose rock or ore						
(*f*) Thawing						
(*g*) Caps, detonators, etc						
(*h*) Unguarded shots						
(*i*) Returned too soon						
(*j*) Premature shot	5		1	6	46.15	*67*
(*k*) Miscellaneous	2	1		3	23.08	*33*
33. Haulage						164
(*a*) Hand and animal						
(*b*) Mechanical		1		1	8.33	*14*
(*c*) Railway cars and locomotives	5	2	4	11	91.67	*150*
34. Steam shovel		1	1	2		24
35. Falls of persons						27
36. Falls of derricks, booms, etc						8
37. Run or fall of ore in or from ore bins						1
38. Machinery (other than 33 and 34)						33
39. Electricity						20
(*a*) Direct contact with trolley wire			1	1	50.00	*10*
(*b*) Tool or bar striking trolley wire						
(*c*) Contact with motor						
(*d*) Others	1			1	50.00	*10*
40. Hand tools						
41. Other causes						45
(*a*) Falling objects other than 31			1	1	50.00	*23*
(*b*) Flying objects	1			1	50.00	*23*
(*c*) Burns						
(*d*) Miscellaneous						
Total number killed by open-pit accidents	**25**	**7**	**9**	**41**	**9.23**	**623**
Grand total	**199**	**138**	**107**	**444**	**100.00**	**6,239**

[1] All figures in italics are calculated on basis of percentage in preceding column.

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TABLE 33.—*INJURIES AT METAL MINES, with principal causes subdivided.*

[Selected returns.]

	Nonfatal injuries.				Group totals per cent.	Total injuries, 1911-1920.[1]
	1918	1919	1920	Total.		
UNDERGROUND.						
Number injured by—						
1. Falls of rock or ore from roof or wall	3,858	2,411	2,185	8,454	.....	70,739
2. Handling rock or ore						37,290
(*a*) Loading at face	846	596	527	1,969	36.40	*13,574*
(*b*) Loading at chute	1,079	655	932	2,666	49.28	*18,376*
(*c*) Sledging	313	229	233	775	14.32	*5,340*
3. Timber or hand tools	1,435	1,005	1,084	3,524	.....	30,811
4. Explosives						4,465
(*a*) Transportation	4	1	5	10	1.72	*77*
(*b*) Charging	4	3	4	11	1.90	*85*
(*c*) Suffocation	29	28	17	74	12.76	*570*
(*d*) Drilling into old holes	7	7	11	25	4.31	*192*
(*e*) Striking in loose rock or ore	18	20	4	42	7.24	*323*
(*f*) Thawing						
(*g*) Caps, detonators, etc	13	8	5	26	4.48	*200*
(*h*) Unguarded shots	28	6	18	52	8.97	*401*
(*i*) Returned too soon	14	20	23	57	9.83	*439*
(*j*) Premature shot	29	12	18	59	10.17	*454*
(*k*) Miscellaneous	90	67	67	224	38.62	*1,724*
5. Haulage						38,879
(*a*) Hand and animal	1,073	1,005	843	2,921	53.11	*20,649*
(*b*) Mechanical	1,177	649	753	2,579	46.89	*18,230*
6 Persons falling down chute, winze, raise, or stope	440	299	216	955	.....	9,006
7. Run of ore from chute or pocket	377	168	128	673	.....	7,528
8. Drilling (by machine or hand drills)	767	505	593	1,865	.....	17,712
9. Electricity						687
(*a*) Direct contact with trolley wire	5	5	4	14	13.59	*93*
(*b*) Tool or bar striking trolley wire	3	2	1	6	5.82	*40*
(*c*) Contact with motor	11	5	3	19	18.45	*127*
(*d*) Others	41	12	11	64	62.14	*427*
10. Machinery other than 5 and 8	119	74	137	330	.....	3,873
11. Mine fires	4	31	.....	35	.....	242
12. Suffocation from natural gases	27	36	12	75	.....	474
13. Inrush of water	3	.....	.....	3	.....	246
14. Nails and splinters	396	195	227	818	.....	4,973
15. Other causes						46,369
(*a*) Falling objects, other than 1 and 2	899	495	522	1,916	27.04	*12,538*
(*b*) Flying objects, other than 2c	321	243	243	807	11.39	*5,281*
(*c*) Burns	58	64	39	161	2.27	*1,053*
(*d*) Miscellaneous	1,817	1,155	1,230	4,202	59.30	*27,497*
Total number injured underground	**15,305**	**10,011**	**10,095**	**35,411**	**79.62**	**273,294**
SHAFT ACCIDENTS.						
Number injured by—						
16. Falling down shafts	25	14	9	48	.....	838
17. Objects falling down shafts	101	59	43	203	.....	2,778
18. Breaking of cables	11	11	1	23	.....	101
19. Overwinding	1	1	.....	2	.....	84
20. Cage, skip, or bucket						2,624
(*a*) Runaway	6	8	5	19	9.60	*252*
(*b*) Riding with rock or ore	17	3	1	21	10.61	*278*
(*c*) Riding with timber or tools	54	8	12	74	37.37	*981*
(*d*) Struck by	39	28	17	84	42.42	*1,113*
21. Other causes	85	158	79	322	.....	2,688
Total number injured by shaft accidents.	**339**	**290**	**167**	**796**	**1.79**	**9,113**

[1] All figures in italics are calculated on basis of percentage in preceding column.

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TABLE 33.—*INJURIES AT METAL MINES, with principal causes subdivided*—Continued.

	Nonfatal injuries.				Group totals per cent.	Total injuries, 1911–1920.
	1918	1919	1920	Total.		
SURFACE ACCIDENTS.						
(At surface plants and shops.)						
Number injured by—						
22. Haulage						2,963
(*a*) Hand and animal	84	54	39	177	51.16	*1,516*
(*b*) Mechanical	62	59	48	169	48.84	*1,447*
23. Railway cars and locomotives	70	34	45	149		1,323
24. Run or fall of ore in or from ore bin	37	31	29	97		952
25. Falls of persons	164	169	134	467		4,541
26. Nails and splinters	99	78	103	280		2,600
27. Hand tools, axes, bars, etc	274	190	187	651		6,135
28. Electricity						431
(*a*) Direct contact with trolley wire	3	2	2	7	10.45	*45*
(*b*) Tool or bar striking trolley wire	3		1	4	5.97	*26*
(*c*) Contact with motor	4	1	3	8	11.94	*51*
(*d*) Others	26	11	11	48	71.64	*309*
29. Machinery	161	105	120	386		4,951
30. Other causes						19,349
(*a*) Falling objects	256	142	186	584	20.83	*4,030*
(*b*) Flying objects	165	100	83	348	12.41	*2,401*
(*c*) Burns	61	55	33	149	5.31	*1,028*
(*d*) Miscellaneous	586	502	635	1,723	61.45	*11,890*
Total number injured by surface accidents	**2,055**	**1,533**	**1,659**	**5,247**	**11.80**	**43,245**
OPEN-PIT ACCIDENTS.						
Numbered injured in pit by—						
31. Falls or slides of rock or ore	248	102	45	395		5,192
32. Explosives						1,122
(*a*) Transportation			1	1	1.11	*12*
(*b*) Charging	9		3	12	13.34	*150*
(*c*) Suffocation						
(*d*) Drilling into old holes		1		1	1.11	*12*
(*e*) Striking in loose rock or ore	1			1	1.11	*12*
(*f*) Thawing						
(*g*) Caps, detonators, etc	2			2	2.22	*25*
(*h*) Unguarded shots	1		2	3	3.33	*38*
(*i*) Returned too soon	1			1	1.11	*12*
(*j*) Premature shot	20		2	22	24.45	*275*
(*k*) Miscellaneous	20	8	19	47	52.22	*586*
33. Haulage						3,668
(*a*) Hand and animal	13	4	11	28	8.56	*314*
(*b*) Mechanical	20	10	3	33	10.09	*370*
(*c*) Railway cars and locomotives	110	106	50	266	81.35	*2,984*
34. Steam shovel	79	49	43	171		2,352
35. Falls of persons	133	57	59	249		2,817
36. Falls of derricks, booms, etc	8	1	1	10		281
37. Run or fall or ore in or from ore bins	4	1		5		138
38. Machinery (other than 33 and 34)	45	27	30	102		1,757
39. Electricity						88
(*a*) Direct contact with trolley wire						
(*b*) Tool or bar striking trolley wire						
(*c*) Contact with motor						
(*d*) Others		1	1	2		
40. Hand tools	125	105	108	338		3,132
41. Other causes						11,100
(*a*) Falling objects other than 31	162	71	85	318	23.89	*2,652*
(*b*) Flying objects	99	44	28	171	12.85	*1,426*
(*c*) Burns	23	20	15	58	4.36	*484*
(*d*) Miscellaneous	275	226	283	784	58.90	*6,538*
Total number injured by open-pit accidents	**1,398**	**833**	**789**	**3,020**	**6.79**	**31,647**
Grand total	**19,097**	**12,667**	**12,710**	**44,474**	**100.00**	**357,299**

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TABLE 34.—*Ten-year summary of accident data, by kinds of mines.*

Kind of mine.	Active operators.	Number of men employed.								Active days.				Total shifts.			
		Actual number.				Equivalent in 300-day workers.											
		Underground.	Open pit.	Surface.	Total.	Underground.	Open pit.	Surface.	Total.	Underground.	Open pit.	Surface.	Total.	Underground.	Open pit.	Surface.	Total.
Copper:																	
1920	**387**	**23,671**	**2,766**	**8,817**	**35,254**	**24,731**	**3,153**	**9,390**	**37,274**	**313**	**342**	**319**	**317**	**7,419,225**	**945,979**	**2,816,915**	**11,182,119**
1919	410	27,298	2,466	9,563	39,327	27,209	2,879	9,434	39,522	299	350	296	301	8,162,636	863,571	2,830,284	11,856,491
1918	524	42,286	3,737	13,424	59,447	45,001	4,444	14,236	63,681	319	357	318	321	13,500,466	1,332,986	4,270,726	19,104,178
1917	649	43,715	3,823	13,737	61,275	45,191	4,405	14,023	63,619	311	346	306	311	13,557,232	1,321,337	4,206,994	19,085,563
1916	604	43,215	2,981	15,032	61,228	44,735	3,585	14,787	63,107	311	361	295	309	13,420,350	1,075,648	4,436,144	18,932,142
1915	548	32,421	2,992	11,761	47,174	32,142	3,513	11,716	47,371	297	352	299	301	9,642,691	1,053,771	3,514,938	14,211,400
1914	585	31,265	3,312	10,109	44,686	29,732	3,799	9,286	42,817	285	344	276	287	8,919,564	1,139,582	2,785,912	12,845,058
1913	694	39,917	.....	16,222	56,139	41,168	.....	16,730	57,898	309	.....	309	309	12,350,220	.....	5,019,046	17,369,266
1912	814	37,539	.....	14,237	51,776	38,260	.....	14,511	52,771	306	.....	306	306	11,478,084	.....	4,353,166	15,831,250
1911	396	31,557	.....	13,136	44,693	32,419	.....	13,495	45,914	308	.....	308	308	9,725,827	.....	4,048,498	13,774,325
Gold and misc. metal:																	
1920	**2,358**	**20,077**	**1,712**	**8,144**	**29,933**	**19,356**	**1,290**	**7,203**	**27,849**	**289**	**226**	**265**	**279**	**5,806,783**	**387,090**	**2,160,957**	**8,354,830**
1919	2,430	21,868	945	9,317	32,130	19,626	738	8,226	28,590	269	234	265	267	5,887,825	221,403	2,467,867	8,577,095
1918	2,429	28,061	1,877	13,705	43,643	28,722	1,678	11,975	42,375	307	268	262	291	8,616,538	503,549	3,592,469	12,712,556
1917	3,166	35,812	2,255	13,825	51,892	34,473	2,154	11,979	48,606	289	287	260	281	10,341,808	646,274	3,593,729	14,581,811
1916	3,921	42,158	1,046	16,903	60,107	38,286	859	14,494	53,639	272	246	257	268	11,485,733	257,815	4,348,194	16,091,742
1915	3,120	29,163	3,865	12,284	45,312	28,198	2,538	10,840	41,576	290	197	265	275	8,459,270	761,502	3,251,910	12,472,682
1914	3,536	35,432	1,420	11,586	48,438	33,012	1,063	10,063	44,138	280	225	261	273	9,903,462	318,805	3,019,013	13,241,280
1913	4,749	44,810	.....	14,691	59,501	41,254	.....	13,525	54,779	276	.....	276	276	12,376,094	.....	4,057,514	16,433,608
1912	4,137	31,322	.....	12,822	44,144	28,925	.....	11,841	40,766	277	.....	277	277	8,677,523	.....	3,552,238	12,229,761
1911	3,817	35,176	.....	13,743	48,919	32,388	.....	12 654	45 042	276	.....	276	276	9,716,478	.....	3,796,155	13,512,633
Iron:																	
1920	**154**	**25,627**	**9,257**	**11,106**	**45,990**	**24,946**	**8,788**	**11,515**	**45,249**	**292**	**285**	**311**	**295**	**7,483,915**	**2,636,253**	**3,454,620**	**13,574,788**
1919	157	28,234	7,041	12,401	47,676	27,389	5,994	11,579	44,962	291	255	280	283	8,216,645	1,798,290	3,473,678	13,488,613
1918	176	28,775	11,484	13,406	53,665	28,515	10,577	12,786	51,878	297	276	286	290	8,554,423	3,172,967	3,835,942	15,563,332
1917	205	31,549	11,177	14,504	57,230	31,032	9,700	13,228	53,960	295	260	274	283	9,309,613	2,909,920	3,968,518	16,188,051
1916	199	30,485	9,700	13,303	53,488	29,766	7,495	12,303	49,564	293	232	277	278	8,929,720	2,248,495	3,690,912	14,869,127
1915	191	23,302	6,321	9,768	39,391	21,447	5,414	8,842	35,703	276	257	272	272	6,434,096	1,624,266	2,652,436	10,710,798
1914	196	24,847	8,149	11,811	44,807	22,305	6,336	10,512	39,153	269	233	267	262	6,691,481	1,900,761	3,153,736	11,745,978
1913	206	29,384	.....	21,749	51,133	28,856	.....	21,359	50,215	295	.....	295	295	8,656,898	.....	6,407,531	15,064,429
1912	194	26,799	.....	18,947	45,746	25,455	.....	17,997	43,452	285	.....	285	285	7,636,470	.....	5,399,015	13,035,485
1911	207	25,461	.....	20,492	45,953	23,546	.....	18,951	42,497	277	.....	277	277	7,063,896	.....	5,685,265	12,749,121

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Lead and zinc (Mississippi Valley):																	
1920	**119**	**8,861**	**23**	**2,754**	**11,638**	**8,221**	**14**	**2,763**	**10,998**	**278**	**185**	**301**	**283**	**2,466,250**	**4,250**	**828,778**	**3,299,278**
1919	141	10,075	66	2,827	12,968	8,429	55	2,413	10,897	251	250	256	252	2,528,821	16,500	723,905	3,269,226
1918	236	10,334	46	3,624	14,004	8,775	12	2,936	11,723	255	77	243	251	2,632,533	3,554	880,916	3,517,003
1917	369	15,075	237	4,957	20,269	12,444	145	4,055	16,644	248	183	245	246	3,733,344	43,463	1,216,583	4,993,390
1916	285	14,687	291	5,637	20,615	12,939	248	4,955	18,142	264	256	264	264	3,881,680	74,430	1,486,468	5,442,578
1915	241	9,493	34	3,450	12,977	8,234	14	2,920	11,168	260	127	254	258	2,470,054	4,328	876,004	3,350,386
1914	248	7,609	27	3,299	10,935	6,467	18	2,779	9,264	255	205	253	254	1,939,979	5,536	833,594	2,779,109
1913	409	9,261	.....	3,436	12,697	7,845	.....	2,911	10,756	254	.....	254	254	2,353,484	.....	873,185	3,226,669
1912	464	10,812	.....	3,520	14,332	9,513	.....	3,097	12,610	264	.....	264	264	2,853,837	.....	929,107	3,782,944
1911	483	9,247	.....	3,274	12,521	7,883	.....	2,791	10,674	256	.....	256	256	2,364,989	.....	837,350	3,202,339
Nonmetallic mineral:																	
1920	**263**	**3,149**	**5,374**	**5,245**	**13,768**	**2,961**	**4,910**	**5,299**	**13,170**	**282**	**274**	**303**	**287**	**888,214**	**1,473,023**	**1,589,641**	**3,950,878**
1919	245	3,356	4,320	5,485	13,161	3,116	3,060	4,724	10,900	279	212	258	248	934,811	917,955	1,417,159	3,269,925
1918	271	2,690	3,338	5,819	11,847	2,425	3,131	5,793	11,349	270	281	299	287	727,521	939,371	1,737,787	3,404,679
1917	248	2,726	3,006	4,181	9,913	2,850	2,547	3,859	9,256	314	254	277	280	855,138	764,206	1,157,652	2,776,996
1916	249	2,618	2,510	4,119	9,247	2,295	1,999	3,709	8,003	263	239	270	260	688,476	599,663	1,112,697	2,400,836
1915	222	1,844	2,517	2,903	7,264	1,464	2,138	2,577	6,179	238	255	266	255	439,081	641,443	773,225	1,853,749
1914	240	2,465	4,125	2,659	9,249	2,102	3,102	2,044	7,248	256	226	231	235	630,531	930,680	613,204	2,174,415
1913	329	2,997	.....	8,809	11,806	2,525	.....	7,421	9,946	253	.....	253	253	757,471	.....	2,226,412	2,983,883
1912	358	3,584	.....	9,617	13,201	3,275	.....	8,789	12,064	274	.....	274	274	982,558	.....	2,636,512	3,619,070
1911	329	3,182	.....	10,711	13,893	2,740	.....	9,221	11,961	258	.....	258	258	821,817	.....	2,766,338	3,588,155
Total United States:																	
1920	**3,281**	**81,385**	**19,132**	**36,066**	**136,583**	**80,215**	**18,155**	**36,170**	**134,540**	**296**	**285**	**301**	**296**	**24,064,387**	**5,446,595**	**10,850,911**	**40,361,893**
1919	3,383	90,831	14,838	39,593	145,262	85,769	12,726	36,376	134,871	283	257	276	279	25,730,738	3,817,719	10,912,893	40,461,350
1918	3,636	112,146	20,482	49,978	182,606	113,438	19,842	47,726	181,006	304	291	286	297	34,031,481	5,952,427	14,317,840	54,301,748
1917	4,637	128,877	20,498	51,204	200,579	125,990	18,951	47,144	192,085	293	277	276	287	37,797,135	5,685,200	14,143,476	57,625,811
1916	5,258	133,163	16,528	54,994	204,685	128,021	14,186	50,248	192,455	288	258	274	282	38,405,959	4,256,051	15,074,415	57,736,425
1915	4,322	96,223	15,729	40,166	152,118	91,485	13,617	36,895	141,997	285	260	276	280	27,445,192	4,085,310	11,068,513	42,599,015
1914	4,805	101,618	17,033	39,464	158,115	93,618	14,318	34,684	142,620	276	252	264	271	28,085,017	4,295,364	10,405,459	42,785,840
1913	6,387	126,369	.....	64,907	191,276	121,648	.....	61,946	183,594	289	.....	286	288	36,494,167	.....	18,583,688	55,077,855
1912	5,967	110,056	.....	59,143	169,199	105,428	.....	56,235	161,663	287	.....	285	287	31,628,472	.....	16,870,038	48,498,510
1911	5,232	104,623	.....	61,356	165,979	98,976	.....	57,112	156,088	284	.....	279	282	29,692,967	.....	17,133,606	46,826,573

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TABLE 34.— *Ten-year summary of accident data, by kinds of mines*—Continued.

Kind of mine.	Number killed.				Number injured.				Accident rates per 1,000 300-day workers.								Widows.	Orphans.
									Fatal.				Nonfatal.					
	Underground and shaft.	Open pit.	Surface.	Total.	Underground and shaft.	Open pit.	Surface.	Total.	Underground and shaft.	Open pit.	Surface.	Total.	Underground and shaft.	Open pit.	Surface.	Total.		
Copper:																		
1920	**107**	**15**	**6**	**128**	**9,624**	**951**	**1,472**	**12,047**	**4.33**	**4.76**	**.64**	**3.43**	**389.15**	**301.62**	**156.76**	**323.20**	**46**	**78**
1919	120	15	5	140	10,002	913	1,321	12,236	4.41	5.21	.53	3.54	367.60	317.12	140.03	309.60	59	109
1918	180	24	16	220	17,201	1,311	2,001	20,513	4.00	5.40	1.12	3.45	382.24	295.00	140.56	322.12	93	177
1917	352	13	9	374	16,532	1,354	2,049	19,935	7.79	2.95	.64	5.88	365.83	307.38	146.12	313.35	142	336
1916	188	21	21	230	16,643	1,481	2,044	20,168	4.20	5.86	1.42	3.64	372.04	413.11	138.23	319.58	84	157
1915	143	9	24	176	12,526	1,284	1,444	15,254	4.45	2.56	2.05	3.72	389.71	365.50	123.25	322.01	99	186
1914	147	10	8	165	11,039	1,342	986	13,367	4.94	2.63	.86	3.85	371.28	353.25	106.18	312.19	69	106
1913	203	24	9	236	10,938	1,521	904	13,363	4.93	.....	1.97	4.08	265.69	.....	144.95	230.80	100	180
1912	185	23	31	239	11,778	951	908	13,637	4.84	.....	3.72	4.53	307.84	.....	128.11	258.42	87	159
1911	199	17	22	238	8,796	807	739	10,342	6.14	.....	2.89	5.18	271.32	.....	114.56	225.25	91	195
Gold and miscellaneous metal:																		
1920	**100**	**2**	**15**	**117**	**4,794**	**75**	**835**	**5,704**	**5.17**	**1.55**	**2.08**	**4.20**	**247.68**	**58.14**	**115.92**	**204.82**	**37**	**56**
1919	113	3	10	126	4,656	74	739	5,469	5.76	4.07	1.22	4.41	237.24	100.27	89.84	191.29	49	72
1918	152	12	17	181	5,429	277	2,141	7,847	5.29	7.15	1.42	4.27	189.02	165.08	178.79	185.18	40	72
1917	166	4	26	196	7,144	215	1,026	8,385	4.82	1.86	2.17	4.03	207.23	99.81	85.65	172.51	41	60
1916	190	2	25	217	8,325	618	1,291	10,234	4.96	2.33	1.72	4.05	217.44	719.44	89.07	190.79	71	116
1915	168	20	11	199	6,990	466	921	8,377	5.96	7.88	1.01	4.79	247.89	183.61	84.96	201.49	77	133
1914	154	14	11	179	4,656	415	530	5,601	4.66	13.17	1.09	4.06	141.04	390.40	52.67	126.90	60	87
1913	180	12	18	210	3,325	223	307	3,855	4.36	.....	2.22	3.83	80.60	.....	39.19	70.37	67	70
1912	147	17	12	176	3,311	166	316	3,793	5.08	.....	2.45	4.32	114.47	.....	40.71	93.04	71	98
1911	163	5	25	193	3,232	109	277	3,618	5.03	.....	2.37	4.28	99.79	.....	30.50	80.33	61	118
Iron:																		
1920	**86**	**6**	**14**	**106**	**6,734**	**1,010**	**1,328**	**9,072**	**3.45**	**.68**	**1.22**	**2.34**	**269.94**	**114.93**	**115.33**	**200.49**	**60**	**130**
1919	107	15	17	139	6,907	813	1,378	9,098	3.91	2.50	1.47	3.09	252.18	135.64	119.01	202.35	77	176
1918	128	40	11	179	6,858	1,493	1,270	9,621	4.49	3.78	.86	3.45	240.50	141.16	99.33	185.45	102	282
1917	135	36	20	191	8,872	1,709	1,697	12,278	4.35	3.71	1.51	3.54	285.90	175.98	128.29	227.54	85	190
1916	133	16	20	169	9,246	1,137	1,521	11,904	4.47	2.13	1.63	3.41	310.62	151.70	123.63	240.17	88	222
1915	78	18	7	103	6,631	758	948	8,337	3.64	3.32	.79	2.88	309.18	140.01	.....	233.51	67	127
1914	120	17	11	148	6,585	1,058	1,130	8,773	5.38	2.68	1.05	3.78	295.23	166.98	107.50	224.07	86	178
1913	122	28	15	165	9,864	2,182	1,427	13,473	4.23	.....	2.01	3.29	341.84	.....	168.98	268.31	81	178
1912	136	27	9	172	7,854	1,472	1,181	10,507	5.34	.....	2.00	3.96	308.54	.....	147.41	241.81	84	198
1911	136	51	10	197	7,844	2,093	785	10,722	5.78	.....	3.22	4.64	333.14	.....	151.87	252.30	114	237

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Lead and zinc (Mississippi Valley):																	
1920	**33**	.....	**3**	**36**	**3,223**	**1**	**383**	**3,607**	**4.01**	.....	**1.09**	**3.27**	**392.04**	**71.43**	**138.62**	**327.97**	**19**	**28**
1919	42	.....	3	45	2,822	.....	363	3,185	4.98	.....	1.24	4.13	334.80	.....	150.44	292.28	27	54
1918	43	.....	4	47	3,145	9	592	3,746	4.90	.....	1.36	3.58	358.40	.....	201.63	319.54	29	59
1917	65	.....	3	68	3,777	36	731	4,544	5.22	.....	.74	4.09	303.50	248.28	180.27	272.99	43	82
1916	52	.....	5	57	3,844	69	860	4,773	4.02	.....	1.01	3.14	297.09	278.23	173.56	263.09	31	61
1915	54	2	4	60	2,370	6	285	2,661	6.56	142.86	1.37	5.37	287.83	428.57	97.60	238.27	23	28
1914	37	1	2	40	1,475	2	274	1,751	5.72	55.56	.72	4.32	228.08	111.11	98.60	189.01	23	53
1913	32	4	6	42	1,141	25	270	1,436	4.08	.....	3.44	3.90	145.44	.....	101.34	133.51	25	46
1912	48	1	5	54	1,748	19	229	1,996	5.05	.....	1.94	4.28	183.75	.....	80.08	158.29	26	62
1911	32	1	10	43	1,300	21	167	1,488	4.06	.....	3.94	4.03	164.91	.....	67.36	139.40	26	40
Nonmetallic mineral:																		
1920	**8**	**15**	**15**	**38**	**571**	**535**	**1,026**	**2,132**	**2.70**	**3.05**	**2.83**	**2.89**	**192.84**	**108.96**	**193.62**	**161.88**	**18**	**24**
1919	6	5	7	18	414	263	841	1,518	1.93	1.63	1.48	1.65	132.86	85.95	178.03	139.27	9	20
1918	10	2	7	19	334	170	684	1,188	4.12	.64	1.21	1.67	137.73	54.30	118.07	104.69	14	25
1917	9	7	7	23	430	212	502	1,144	3.16	2.75	1.81	2.48	150.88	83.24	130.09	123.60	15	28
1916	11	8	5	24	391	223	544	1,158	4.79	4.00	1.35	3.00	170.37	111.56	146.67	144.70	11	18
1915	8	5	2	15	212	179	275	666	5.46	2.34	.78	2.43	144.81	83.72	106.71	107.78	9	10
1914	8	14	5	27	242	286	196	724	3.81	4.47	2.45	3.73	115.13	92.20	95.89	99.89	14	18
1913	11	18	1	30	257	545	42	844	4.36	.....	2.56	3.02	101.78	.....	79.10	84.86	13	27
1912	6	12	2	20	169	591	41	801	1.83	.....	1.59	1.66	51.60	.....	71.91	66.40	5	3
1911	12	12	.....	24	206	177	24	407	4.38	.....	1.30	2.01	75.18	.....	21.80	34.03	5	10
Total United States:																		
1920	**334**	**38**	**53**	**425**	**24,946**	**2,572**	**5,044**	**32,562**	**4.16**	**2.09**	**1.47**	**3.16**	**310.99**	**141.67**	**139.45**	**242.02**	**180**	**316**
1919	388	38	42	468	24,801	2,063	4,642	31,506	4.52	2.99	1.15	3.47	289.16	162.11	127.61	233.60	221	431
1918	513	78	55	646	32,967	3,260	6,688	42,915	4.52	3.93	1.15	3.57	290.62	164.30	140.13	237.09	278	615
1917	727	60	65	852	36,755	3,526	6,005	46,286	5.77	3.17	1.38	4.44	291.73	186.06	127.38	240.97	325	692
1916	574	47	76	697	38,449	3,528	6,260	48,237	4.48	3.31	1.51	3.62	300.33	248.70	124.58	250.64	285	574
1915	451	54	48	553	28,729	2,693	3,873	35,295	4.93	3.97	1.30	3.89	314.03	197.77	104.97	248.56	275	484
1914	466	56	37	559	23,997	3,103	3,116	30,216	4.98	3.91	1.07	3.92	256.33	216.72	89.84	211.87	252	442
1913	548	86	49	683	25,525	4,496	2,950	32,971	4.50	.....	2.18	3.72	209.83	.....	120.20	179.59	286	501
1912	522	80	59	661	24,860	3,199	2,675	30,734	4.95	.....	2.47	4.09	235.80	.....	104.45	190.11	273	520
1911	542	86	67	695	21,378	3,207	1,992	26,577	5.48	.....	2.68	4.45	215.99	.....	90.03	170.27	297	600

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TABLE 35.—***FATALITIES:*** *By kinds of mines and causes,*

Kind of Mine.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Copper:										
1920	**47**	**2**	**1**	**14**	**7**	**7**	**2**	.....	**2**	.....
1919	50	1	.....	10	8	12	2	1	2	1
1918	63	10	1	19	25	10	3	.....	6	.....
1917	75	6	1	19	13	15	2	.....	3	.....
1916	66	3	.....	18	7	14	3	.....	7	.....
1915	69	2	4	16	5	13	2	.....	5	.....
1914	57	2	1	14	10	22	4	1	5	.....
1913	76	2	1	23	20	25	6	.....	6	.....
1912	87	.....	4	21	9	16	6	1	9	.....
1911	82	.....	6	18	5	19	6	.....	6	3
Gold and miscellaneous metal:										
1920	**33**	**2**	.....	**18**	**3**	**9**	**1**	**1**	**5**	**1**
1919	31	2	1	17	3	13	2	.....	5	.....
1918	51	1	2	16	5	25	3	1	5	1
1917	42	2	1	28	4	26	3	.....	6	1
1916	66	5	1	28	9	13	4	.....	5	1
1915	49	4	2	37	7	23	5	1	4	.....
1914	52	1	.....	22	6	21	1	2	3	.....
1913	68	1	3	35	2	21	2	.....	5	4
1912	49	1	1	27	7	17	2	.....	5	.....
1911	40	.....	2	24	7	18	6	.....	7	5
Iron:										
1920	**42**	**4**	**2**	**7**	**12**	**2**	**3**	**1**	**1**	.....
1919	61	1	.....	7	17	5	2	.....	2	.....
1918	46	1	1	15	8	3	.....	3	5	.....
1917	60	4	.....	7	16	13	2	1	1	1
1916	53	1	1	15	16	12	3	.....	3	.....
1915	42	3	1	6	4	8	3	.....	1	.....
1914	51	3	1	8	13	5	.....	.....	.....	.....
1913	52	7	3	11	12	4	2	.....	4	.....
1912	55	1	1	15	17	9	1	1	2	2
1911	45	.....	1	11	6	10	2	.....	.....	2
Lead and zinc (Mississippi Valley):										
1920	**13**	**1**	.....	**3**	**6**	.....	.....	.....	**1**	.....
1919	19	.....	1	7	2	.....	4	.....	.....	.....
1918	13	1	.....	4	3	.....	.....	.....	.....	.....
1917	23	3	.....	15	3	2	.....	.....	1	.....
1916	27	1	.....	10	1	1	1	.....	1	1
1915	27	1	.....	11	1	1	.....	.....	.....	.....
1914	20	1	1	4	.....	.....	.....	.....	.....	1
1913	16	.....	1	7	1	1	.....	.....	1	.....
1912	18	.....	.....	9	1	1	1	.....	3	.....
1911	18	.....	1	3	2	.....	.....	.....	2	.....
Nonmetallic mineral:										
1920	**3**	.....	.....	**2**	**1**	.....	.....	**1**	.....	.....
1919	3	.....	.....	.....	1	.....	.....	.....	1	.....
1918	5	.....	.....	2	1	.....	.....	.....	.....	.....
1917	6	.....	.....	.....	.....	.....	.....	1	.....	1
1916	5	.....	.....	3	.....	.....	.....	.....	1	.....
1915	4	.....	.....	2	1	.....	.....	.....	.....	.....
1914	5	.....	.....	1	2	.....	.....	.....	.....	.....
1913	8	.....	.....	1	.....	1	.....	.....	.....	.....
1912	3	.....	.....	1	1	.....	.....	.....	.....	.....
1911	6	.....	.....	6	.....	.....	.....	.....	.....	.....
Total, United States:										
1920	**138**	**9**	**3**	**44**	**29**	**18**	**6**	**3**	**9**	**1**
1919	164	4	2	41	31	30	10	1	10	1
1918	178	13	4	56	42	38	6	4	16	1
1917	206	15	2	69	36	56	7	2	11	3
1916	217	10	2	74	33	40	11	.....	17	2
1915	191	10	7	72	18	45	10	1	10	.....
1914	185	7	3	49	31	48	5	3	8	1
1913	220	10	8	77	35	52	10	.....	16	4
1912	212	2	6	73	35	43	10	2	19	2
1911	191	.....	10	62	20	47	14	.....	15	10
Total, 10 years	**1,902**	**80**	**47**	**617**	**310**	**417**	**89**	**16**	**131**	**25**

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during the years ended Dec. 31, 1911 to 1920.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
.....	2	.....	.....	6	90	6	3	.....	.....	6	2	17
1	1	.....	.....	3	92	11	.....	2	3	10	2	28
3	.....	.....	1	4	145	9	3	3	1	14	5	35
164	3	2	.....	12	315	9	6	.....	1	15	6	37
23	1	.....	.....	8	150	17	2	.....	.....	13	6	38
.....	.....	.....	1	2	119	8	3	1	1	9	2	24
2	.....	.....	.....	1	119	8	2	.....	.....	15	3	28
.....	.....	.....	.....	12	171	9	7	.....	1	9	6	32
.....	1	.....	.....	3	157	11	2	.....	.....	14	1	28
12	2	.....	.....	1	160	17	5	.....	.....	.....	17	39
.....	4	.....	.....	4	81	8	.....	1	.....	8	2	19
2	2	.....	.....	2	80	15	2	.....	5	7	4	33
.....	2	1	.....	8	121	13	6	.....	.....	10	2	31
1	.....	2	.....	7	123	10	10	2	2	16	3	43
4	4	.....	.....	10	150	16	6	2	2	11	3	40
.....	2	.....	.....	.....	134	19	6	.....	.....	6	3	34
4	1	.....	.....	3	116	13	2	2	.....	19	2	38
.....	3	.....	.....	6	150	10	5	.....	.....	13	2	30
1	3	.....	.....	1	114	16	2	2	.....	10	3	33
17	5	.....	.....	2	133	16	8	3	.....	.....	3	30
.....	.....	.....	.....	2	76	5	1	.....	.....	4	.....	10
1	1	.....	.....	.....	97	3	3	.....	.....	3	1	10
.....	.....	17	.....	4	103	8	5	.....	1	11	.....	25
.....	1	.....	.....	1	107	15	2	1	.....	9	1	28
.....	1	1	1	4	111	8	7	.....	.....	7	.....	22
.....	1	.....	.....	1	70	2	1	1	.....	3	1	8
2	.....	8	.....	2	93	10	4	.....	.....	7	6	27
.....	.....	.....	.....	3	98	6	2	2	1	11	2	24
.....	.....	5	.....	2	111	7	4	.....	.....	13	1	25
8	1	12	.....	5	103	23	3	1	.....	.....	6	33
.....	1	.....	.....	1	26	3	2	.....	.....	1	1	7
.....	.....	.....	.....	2	35	3	1	.....	.....	3	.....	7
.....	1	2	.....	1	25	8	2	.....	1	5	2	18
.....	2	.....	.....	2	51	7	3	1	.....	1	2	14
.....	.....	.....	1	.....	44	4	3	.....	.....	1	.....	8
.....	.....	3	.....	.....	44	5	2	.....	.....	2	1	10
2	.....	.....	.....	1	30	3	2	.....	.....	2	.....	7
.....	.....	.....	.....	1	28	1	1	.....	1	1	.....	4
.....	.....	.....	.....	2	35	5	4	.....	.....	.....	4	13
.....	.....	.....	.....	2	28	1	2	.....	.....	.....	1	4
.....	.....	.....	.....	.....	7	.....	.....	.....	.....	1	.....	1
.....	.....	.....	.....	.....	5	.....	1	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	8	1	1	.....	.....	.....	.....	2
.....	.....	.....	.....	1	9	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	10	.....	.....	.....	.....	1	.....	1
.....	.....	.....	.....	.....	7	.....	1	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	8	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	11	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	5	1	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....
.....	7	.....	.....	13	280	22	6	1	.....	20	5	54
4	4	.....	.....	7	309	32	7	2	8	23	7	79
3	3	20	1	17	402	39	17	3	3	40	9	111
165	6	4	.....	23	605	41	21	4	3	41	12	122
27	6	1	2	23	465	45	18	2	2	33	9	109
.....	3	3	1	3	374	34	13	2	1	20	7	77
10	1	8	.....	7	366	34	10	2	.....	43	11	100
.....	3	.....	.....	23	458	26	15	2	3	34	10	90
1	4	5	.....	8	422	40	12	2	.....	37	9	100
37	8	12	.....	10	436	57	18	4	.....	.....	27	106
247	45	53	4	134	4,117	370	137	24	20	291	106	948

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TABLE 35.—***FATALITIES:*** *By kinds of mines and causes.*

Kind of Mine.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Copper:										
1920	.....	1	.....	.....	.....	.....	1	.....	4	6
1919	1	.....	1	2	.....	.....	.....	.....	1	5
1918	2	1	.....	2	.....	.....	2	4	5	16
1917	4	3	.....	.....	.....	.....	.....	1	1	9
1916	3	3	.....	4	.....	.....	1	5	5	21
1915	1	3	.....	2	.....	16	.....	1	1	24
1914	2	2	.....	1	.....	.....	.....	.....	3	8
1913	1	2	.....	.....	.....	.....	2	3	1	9
1912	1	5	.....	4	.....	.....	3	3	15	31
1911	.....	3	1	.....	.....	.....	1	3	14	22
Gold and miscellaneous metal:										
1920	2	.....	.....	.....	.....	.....	1	4	8	15
1919	.....	.....	.....	2	.....	1	.....	2	5	10
1918	.....	1	.....	2	1	.....	4	2	7	17
1917	.....	.....	.....	8	.....	.....	4	2	12	26
1916	1	1	.....	3	.....	.....	5	2	13	25
1915	2	1	.....	.....	.....	.....	1	5	2	11
1914	.....	2	2	.....	.....	.....	3	2	2	11
1913	2	1	.....	2	1	.....	1	5	6	18
1912	3	.....	.....	.....	.....	.....	1	5	3	12
1911	3	.....	1	.....	.....	.....	1	3	17	25
Iron:										
1920	3	4	.....	.....	.....	.....	2	2	3	14
1919	1	7	.....	5	.....	.....	1	1	2	17
1918	3	4	.....	.....	.....	.....	1	1	2	11
1917	3	2	.....	2	.....	.....	.....	2	11	20
1916	5	1	1	6	1	.....	.....	2	4	20
1915	1	2	1	.....	.....	.....	.....	.....	3	7
1914	1	1	2	3	.....	.....	1	1	2	11
1913	4	.....	2	3	.....	.....	1	1	4	15
1912	2	.....	2	2	.....	.....	1	1	1	9
1911	1	2	1	.....	.....	.....	.....	2	4	10
Lead and zinc (Mississippi Valley):										
1920	.....	.....	.....	1	.....	.....	.....	.....	2	3
1919	.....	.....	.....	2	.....	.....	1	.....	.....	3
1918	.....	.....	.....	1	.....	.....	1	.....	2	4
1917	.....	.....	.....	1	.....	.....	1	.....	1	3
1916	.....	.....	.....	2	.....	.....	1	1	1	5
1915	.....	.....	.....	1	.....	.....	.....	.....	3	4
1914	.....	.....	.....	.....	.....	.....	.....	1	1	2
1913	2	1	.....	.....	.....	.....	1	2	.....	6
1912	.....	.....	.....	.....	.....	.....	.....	1	4	5
1911	.....	3	.....	.....	.....	.....	.....	.....	7	10
Nonmetallic mineral:										
1920	.....	4	1	1	.....	.....	3	3	3	15
1919	.....	1	1	.....	.....	.....	3	1	1	7
1918	1	2	1	.....	.....	1	.....	2	.....	7
1917	.....	2	.....	2	.....	.....	1	1	1	7
1916	.....	.....	1	.....	.....	1	.....	2	1	5
1915	.....	1	1	.....	.....	.....	.....	.....	.....	2
1914	.....	2	1	.....	.....	.....	2	.....	.....	5
1913	.....	.....	.....	.....	.....	.....	.....	.....	1	1
1912	.....	.....	.....	.....	.....	.....	.....	1	1	2
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, United States:										
1920	5	9	1	2	.....	.....	7	9	20	53
1919	2	8	2	11	.....	1	5	4	9	42
1918	6	8	1	5	1	1	8	9	16	55
1917	7	7	.....	13	.....	.....	6	6	26	65
1916	9	5	2	15	1	1	7	12	24	76
1915	4	7	2	3	.....	.....	1	6	25	48
1914	3	7	5	4	.....	.....	6	4	8	37
1913	9	4	2	5	1	.....	5	11	12	49
1912	6	5	2	6	.....	.....	5	11	24	59
1911	4	8	3	.....	.....	.....	2	8	42	67
Total, 10 years	55	68	20	64	3	3	52	80	206	551

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during the years ended Dec. 31, 1911 to 1920—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		
.....	6	7	1	.....	.....	.....	.....	.....	.....	15	1	123
8	2	2	2	.....	.....	.....	.....	1	.....	.....	15	140
7	11	5	.....	.....	.....	.....	.....	.....	.....	1	24	220
4	1	8	.....	.....	.....	.....	.....	.....	.....	.....	13	374
5	6	7	.....	.....	.....	.....	.....	1	.....	2	21	230
2	.....	6	.....	1	.....	.....	.....	.....	.....	.....	9	176
1	6	3	.....	.....	.....	.....	.....	.....	.....	.....	10	165
4	6	12	.....	.....	.....	.....	2	.....	.....	.....	24	236
3	13	4	2	.....	.....	.....	.....	.....	.....	1	23	239
7	5	2	.....	1	.....	.....	2	.....	.....	.....	17	238
.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	2	117
2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	3	126
2	1	1	.....	.....	1	1	2	.....	.....	4	12	181
.....	1	1	.....	1	.....	.....	.....	.....	.....	1	4	196
.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	2	217
6	5	1	.....	3	.....	.....	2	2	.....	1	20	199
3	3	1	.....	2	1	.....	1	2	.....	1	14	179
1	2	1	.....	.....	1	.....	3	2	.....	2	12	210
5	1	4	2	1	.....	.....	1	1	.....	2	17	176
3	.....	.....	.....	1	.....	.....	.....	.....	.....	1	5	193
1	.....	1	2	1	.....	.....	.....	1	.....	.....	6	106
5	2	4	3	1	.....	.....	.....	.....	.....	.....	15	139
5	20	9	2	1	.....	.....	.....	.....	.....	3	40	179
11	8	13	2	1	.....	.....	1	.....	.....	.....	36	191
2	6	5	1	.....	1	.....	.....	.....	.....	1	16	169
2	1	11	1	1	1	.....	.....	.....	.....	1	18	103
7	2	5	1	1	.....	.....	1	.....	.....	.....	17	148
8	3	11	2	1	.....	.....	2	1	.....	.....	28	165
5	5	11	.....	1	2	.....	2	.....	.....	1	27	172
22	10	14	1	.....	1	.....	1	.....	.....	2	51	197
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	57
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	2	60
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	40
1	1	.....	.....	.....	.....	.....	1	.....	.....	1	4	42
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	54
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	43
3	6	.....	1	2	.....	.....	.....	1	.....	2	15	38
1	3	.....	.....	.....	.....	.....	1	.....	.....	.....	5	18
.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	2	19
2	.....	1	.....	.....	.....	.....	.....	2	.....	2	7	23
1	3	.....	.....	2	.....	.....	.....	1	.....	1	8	24
2	.....	.....	.....	1	.....	.....	.....	1	.....	1	5	15
7	.....	.....	.....	1	.....	.....	3	1	.....	2	14	27
3	.....	6	.....	.....	.....	.....	2	2	.....	5	18	30
3	2	1	.....	1	.....	.....	2	.....	.....	3	12	20
3	1	5	.....	1	.....	.....	1	.....	.....	1	12	24
4	13	8	5	3	.....	.....	.....	2	.....	3	38	425
16	7	6	5	2	.....	.....	1	1	.....	.....	38	468
14	33	15	2	1	1	1	2	1	.....	8	78	646
17	10	23	2	2	.....	.....	1	2	.....	3	60	852
8	15	13	1	2	1	.....	1	2	.....	4	47	697
12	6	19	1	6	1	.....	2	3	.....	4	54	553
18	11	9	1	4	1	.....	5	3	.....	4	56	559
17	12	30	2	1	1	.....	10	5	.....	8	86	683
16	21	20	4	3	2	.....	6	1	.....	7	80	661
35	16	21	1	3	1	.....	5	.....	.....	4	86	695
157	144	164	24	27	8	1	33	20	.....	45	623	6,239

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TABLE 36.—***INJURIES:*** *By kinds of mines and causes.*

Kind of Mine.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Copper:										
1920	**2,450**	**1,243**	**1,032**	**135**	**1,221**	**273**	**173**	**597**	**12**	**72**
1919	2,813	1,290	1,045	154	1,269	233	230	417	20	66
1918	4,852	2,304	1,722	196	2,250	537	452	874	34	83
1917	4,500	2,351	1,760	223	2,142	446	246	802	25	134
1916	4,758	2,484	2,078	280	2,070	495	658	723	25	133
1915	3,329	1,902	1,289	124	1,493	374	300	962	26	307
1914	3,015	1,903	1,103	125	1,343	434	318	580	21	60
1913	3,216	1,014	1,589	124	1,499	555	479	511	12	135
1912	3,740	1,611	1,185	105	1,142	556	541	626	19	193
1911	3,273	.....	788	96	1,853	549	489	564	14	324
Gold and Miscellaneous Metal:										
1920	**990**	**575**	**524**	**99**	**522**	**220**	**115**	**474**	**11**	**34**
1919	1,074	682	414	77	493	215	58	406	9	41
1918	1,035	730	453	76	656	249	58	379	27	69
1917	1,123	679	548	108	615	308	141	502	25	192
1916	2,017	1,089	729	146	929	346	138	695	28	57
1915	1,512	948	846	83	761	309	195	613	21	51
1914	1,225	472	528	72	609	223	146	416	4	64
1913	806	261	360	61	406	183	287	298	8	68
1912	893	244	394	64	409	158	246	251	5	56
1911	978	.....	269	90	326	119	275	258	4	71
Iron:										
1920	**1,441**	**1,157**	**983**	**97**	**1,101**	**133**	**123**	**386**	**28**	**117**
1919	1,727	947	999	69	1,067	179	91	343	33	77
1918	1,579	929	880	228	1,015	170	103	285	33	92
1917	1,846	1,413	1,202	107	1,586	209	165	455	26	64
1916	2,053	1,304	1,260	322	1,645	155	178	509	33	68
1915	1,430	920	981	76	1,135	123	161	406	16	48
1914	1,532	877	1,002	85	1,110	142	179	373	20	53
1913	2,448	968	1,754	154	1,730	202	349	557	37	227
1912	2,036	791	1,206	193	1,485	188	238	591	12	102
1911	2,556	.....	964	147	1,154	192	203	443	11	227
Lead and zinc (Mississippi Valley):										
1920	**369**	**852**	**81**	**37**	**442**	**47**	**24**	**289**	**9**	**80**
1919	554	516	69	41	384	69	9	266	10	23
1918	480	805	86	47	449	49	7	315	21	39
1917	528	776	90	54	433	103	37	363	6	17
1916	651	960	117	50	527	63	44	302	3	67
1915	323	640	83	44	308	37	25	169	6	41
1914	303	239	72	44	193	20	6	90	3	22
1913	206	285	77	22	134	6	3	112	.....	48
1912	299	453	60	26	228	37	16	124	2	109
1911	386	.....	36	34	157	45	12	121	4	49
Nonmetallic mineral:										
1920	**69**	**85**	**15**	**38**	**109**	**12**	**2**	**56**	**5**	**15**
1919	31	90	29	22	77	15	3	42	6	10
1918	27	54	12	8	63	5	1	28	3	12
1917	35	114	18	7	49	8	1	25	3	11
1916	56	114	11	12	55	1	.....	24	.....	7
1915	29	66	11	15	35	4	1	7	.....	2
1914	29	62	25	8	48	4	.....	29	4	5
1913	38	56	15	15	65	1	.....	22	2	9
1912	16	35	11	11	47	2	.....	21	1	11
1911	63	.....	6	14	40	3	2	11	.....	11
Total, United States:										
1920	**5,319**	**3,912**	**2,635**	**406**	**3,395**	**685**	**437**	**1,802**	**65**	**318**
1919	6,199	3,525	2,556	363	3,290	715	391	1,474	78	217
1918	7,973	4,822	3,153	555	4,433	1,010	621	1,881	118	295
1917	8,032	5,333	3,618	499	4,825	1,074	590	2,147	85	418
1916	9,535	5,951	4,195	810	5,226	1,060	1,018	2,253	89	332
1915	6,623	4,476	3,210	342	3,732	847	682	2,157	69	449
1914	6,104	3,553	2,730	334	3,303	823	649	1,488	52	294
1913	6,714	2,584	3,795	376	3,834	967	1,118	1,500	59	487
1912	6,984	3,134	2,856	399	3,311	941	1,041	1,613	39	471
1911	7,256	.....	2,063	381	3,530	908	981	1,397	33	682
Total, 10 years	**70,739**	**37,290**	**30,811**	**4,465**	**38,879**	**9,006**	**7,528**	**17,712**	**687**	**3,573**

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during the years ended Dec. 31, 1911 to 1920.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
.....	11	.....	231	1,939	9,389	18	49	3	.....	50	115	235
4	42	1	186	1,930	9,700	17	63	14	2	64	142	302
4	36	3	405	3,055	16,807	21	132	9	1	122	109	394
39	31	3	296	3,172	16,170	18	121	3	1	90	129	362
2	13	.....	237	2,391	16,347	41	89	.....	1	57	108	296
12	18	.....	227	1,880	12,243	26	97	1	.....	61	98	283
1	3	.....	108	1,779	10,793	16	71	.....	.....	90	69	246
9	5	3	120	1,394	10,665	35	99	2	3	74	60	273
6	3	1	130	1,630	11,488	63	110	.....	.....	79	38	290
7	8	.....	.....	682	8,647	23	56	5	3	.....	62	149
.....	12	.....	151	875	4,602	18	57	2	3	59	53	192
37	7	.....	160	755	4,428	24	49	4	6	77	68	228
.....	6	136	105	1,248	5,227	19	43	6	1	64	69	202
3	14	1	191	2,351	6,801	29	65	8	3	107	131	343
5	16	1	213	1,542	7,951	56	91	4	3	108	112	374
14	36	13	212	1,177	6,791	21	45	2	1	84	46	199
5	11	.....	36	704	4,515	15	39	9	1	43	34	141
1	10	1	36	412	3,198	18	35	2	2	42	28	127
6	14	1	26	413	3,180	15	46	3	2	38	27	131
7	4	9	.....	699	3,109	18	34	.....	13	.....	58	123
6	29	.....	154	810	6,565	22	44	2	3	67	31	169
6	14	6	152	994	6,704	19	32	.....	4	67	81	203
.....	1	1	156	1,120	6,592	9	57	2	.....	106	92	266
3	9	.....	198	1,313	8,596	22	49	4	2	96	103	276
.....	6	3	178	1,231	8,945	24	62	.....	2	112	101	301
1	11	.....	131	964	6,403	11	70	1	.....	80	66	228
.....	8	12	80	901	6,374	12	48	.....	2	86	63	211
1	6	13	142	1,015	9,603	38	85	5	3	87	43	261
.....	18	8	71	651	7,590	18	91	2	1	96	56	264
6	4	1	.....	1,721	7,629	40	77	.....	8	.....	90	215
.....	13	1	81	697	3,022	14	76	.....	2	76	33	201
23	9	.....	38	660	2,671	8	61	.....	2	58	22	151
.....	13	3	96	492	2,902	20	73	1	.....	94	55	243
.....	10	.....	118	858	3,393	16	214	2	2	81	69	384
14	3	.....	115	668	3,584	9	101	1	1	81	67	260
15	13	21	113	410	2,248	3	56	1	1	33	28	122
.....	.....	.....	8	375	1,375	7	24	.....	.....	39	30	100
1	.....	.....	17	167	1,078	6	26	.....	.....	14	17	63
.....	.....	.....	14	285	1,653	8	30	1	2	32	22	95
4	2	3	.....	310	1,163	11	88	2	2	.....	34	137
.....	1	.....	7	142	556	.....	3	.....	1	.....	11	15
.....	.....	.....	2	74	401	2	4	.....	.....	1	6	13
.....	.....	.....	6	106	325	2	2	.....	.....	2	3	9
.....	.....	.....	11	144	426	.....	1	.....	.....	.....	3	4
.....	.....	.....	7	90	377	2	4	.....	.....	2	6	14
.....	4	.....	3	31	208	.....	3	.....	.....	1	.....	4
.....	.....	.....	2	24	240	.....	.....	.....	.....	2	.....	2
.....	.....	.....	3	22	248	3	4	.....	.....	2	.....	9
.....	.....	.....	.....	13	168	.....	1	.....	.....	.....	.....	1
.....	.....	1	.....	53	204	1	1	.....	.....	.....	.....	2
6	66	1	624	4,463	24,134	72	229	7	9	252	243	812
70	72	7	538	4,413	23,904	70	209	18	14	267	319	897
4	56	143	768	6,021	31,853	71	307	18	2	388	328	1,114
45	64	4	814	7,838	35,386	85	450	17	8	374	435	1,369
21	38	4	750	5,922	37,204	132	347	5	7	360	394	1,245
42	82	34	686	4,462	27,893	61	271	5	2	259	238	836
6	22	12	234	3,783	23,297	50	182	9	3	260	196	700
12	21	17	318	3,010	24,792	100	249	9	8	219	148	733
12	35	10	241	2,992	24,079	104	278	6	5	245	143	781
24	18	14	.....	3,465	20,752	93	256	7	26	.....	244	626
242	474	246	4,973	46,369	273,294	838	2,778	101	84	2,624	2,638	9,113

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TABLE 36.—***INJURIES:*** *By kinds of mines and causes.*

Kind of mine.	Surface.									Total, surface.
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	
	22	23	24	25	26	27	28	29	30	
Copper:										
1920	**69**	**19**	**31**	**142**	**69**	**161**	**6**	**112**	**863**	**1,472**
1919	120	26	33	137	71	167	9	100	658	**1,321**
1918	107	47	41	207	93	316	26	188	976	**2,001**
1917	145	62	45	207	79	303	8	139	1,061	**2,049**
1916	137	40	44	211	80	218	22	161	1,131	**2,044**
1915	62	29	34	134	67	190	5	134	789	**1,444**
1914	105	22	40	100	42	188	10	107	372	**986**
1913	74	27	30	87	25	181	8	123	349	**904**
1912	63	29	37	129	20	159	6	204	261	**908**
1911	33	16	62	.....	.....	.....	15	77	536	**739**
Gold and miscellaneous metal:										
1920	**98**	**17**	**12**	**95**	**52**	**131**	**13**	**99**	**318**	**835**
1919	77	14	1	89	25	98	13	70	352	**739**
1918	102	23	12	251	189	197	19	239	1,109	**2,141**
1917	75	21	19	105	96	131	19	123	437	**1,026**
1916	134	28	19	131	88	179	15	145	552	**1,291**
1915	81	15	21	114	67	132	33	116	342	**921**
1914	45	28	14	49	19	93	6	71	205	**530**
1913	34	3	8	33	11	52	4	78	84	**307**
1912	28	6	5	32	28	51	14	55	97	**316**
1911	43	5	10	.....	.....	.....	6	58	155	**277**
Iron:										
1920	**91**	**96**	**20**	**175**	**89**	**214**	**22**	**123**	**498**	**1,328**
1919	137	82	6	182	74	248	11	116	522	**1,378**
1918	97	44	17	142	61	187	6	123	593	**1,270**
1917	136	70	28	190	114	254	17	143	745	**1,697**
1916	131	69	20	176	87	216	10	151	661	**1,521**
1915	54	27	17	113	51	175	5	93	413	**948**
1914	84	30	22	196	55	185	7	114	437	**1,130**
1913	46	44	12	221	65	408	10	164	457	**1,427**
1912	56	41	59	208	47	315	9	172	274	**1,181**
1911	91	29	36	.....	.....	.....	1	188	441	**785**
Lead and zinc (Mississippi Valley):										
1920	**16**	**8**	**7**	**31**	**45**	**50**	**3**	**67**	**156**	**383**
1919	11	7	6	24	18	32	2	18	245	**363**
1918	35	17	15	37	47	51	5	72	313	**592**
1917	31	26	24	54	84	83	7	131	291	**731**
1916	34	25	30	102	96	93	6	98	376	**860**
1915	14	9	24	24	42	35	5	27	105	**285**
1914	14	7	11	16	15	39	2	24	146	**274**
1913	2	55	2	28	25	32	.....	45	81	**270**
1912	21	1	19	22	19	36	.....	37	74	**229**
1911	13	6	9	.....	.....	.....	1	53	85	**167**
Nonmetallic mineral:										
1920	**24**	**27**	**8**	**83**	**146**	**137**	**7**	**159**	**435**	**1,026**
1919	49	19	3	92	31	83	14	211	339	**841**
1918	47	33	5	35	61	77	13	76	337	**684**
1917	24	44	7	37	47	48	4	41	250	**502**
1916	40	14	12	38	97	117	5	47	174	**544**
1915	7	7	6	27	39	44	1	24	120	**275**
1914	9	6	8	26	14	21	1	17	94	**196**
1913	10	.....	2	7	1	7	.....	8	7	**42**
1912	2	2	.....	2	9	1	.....	5	20	**41**
1911	5	1	.....	.....	.....	.....	.....	5	13	**24**
Total, United States:										
1920	**298**	**167**	**78**	**526**	**401**	**693**	**51**	**560**	**2,270**	**5,044**
1919	394	148	49	524	219	628	49	515	2,116	**4,642**
1918	388	164	90	672	451	828	69	698	3,328	**6,688**
1917	411	223	123	593	420	819	55	577	2,784	**6,005**
1916	476	176	125	658	448	823	58	602	2,894	**6,260**
1915	218	87	102	412	266	576	49	394	1,769	**3,873**
1914	257	93	95	387	145	526	26	333	1,254	**3,116**
1913	166	129	54	376	127	680	22	418	978	**2,950**
1912	170	79	120	393	123	562	29	473	726	**2,675**
1911	185	57	116	.....	.....	.....	23	381	1,230	**1,992**
Total, 10 years	**2,963**	**1,323**	**952**	**4,541**	**2,600**	**6,135**	**431**	**4,951**	**19,349**	**43,245**

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during the years ended Dec. 31, 1911 to 1920—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.)	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		
83	**24**	**70**	**72**	**66**	**3**	.....	**38**	**3**	**127**	**465**	**951**	**12,047**
153	17	134	74	62	2	1	17	1	100	352	913	12,236
275	37	126	77	115	3	3	55	.....	126	494	1,311	20,513
304	24	117	67	147	8	4	37	1	84	561	1,354	19,935
316	8	111	36	46	2	1	27	3	79	852	1,481	20,168
343	23	113	52	124	3	2	35	2	76	511	1,284	15,254
303	84	162	52	146	1	1	60	4	92	437	1,342	13,367
361	93	134	67	181	1	3	49	3	112	517	1,521	13,363
244	66	104	104	99	30	.....	41	5	27	231	951	13,637
225	52	89	45	112	37	.....	171	4	.....	72	807	10,342
13	**2**	**9**	**5**	**6**	**3**	.....	**2**	.....	**11**	**24**	**75**	**5,704**
13	.....	12	2	9	.....	.....	7	.....	9	22	74	5,469
31	8	22	2	41	22	7	19	3	30	92	277	7,847
43	11	23	.....	10	.....	1	11	1	22	93	215	8,385
36	4	11	.....	84	.....	.....	137	2	110	234	618	10,234
45	7	2	.....	55	3	1	91	5	69	188	466	8,377
45	5	7	.....	32	.....	5	97	3	120	101	415	5,601
31	6	10	35	27	3	1	9	3	38	60	223	3,855
36	2	3	17	23	3	1	8	1	46	26	166	3,793
16	7	10	6	24	6	2	10	3	.....	25	109	3,618
145	**28**	**129**	**125**	**71**	**11**	**1**	**36**	**1**	**128**	**335**	**1,010**	**9,072**
107	20	79	160	47	9	1	25	.....	100	265	813	9,098
177	32	264	153	110	9	5	40	1	144	558	1,493	9,621
206	65	269	233	143	3	16	51	1	211	511	1,709	12,278
145	40	200	144	93	3	10	26	4	123	349	1,137	11,904
126	13	94	42	67	3	6	8	.....	113	286	758	8,337
143	35	126	100	101	9	.....	19	.....	140	385	1,058	8,773
361	90	264	244	151	30	22	70	2	350	598	2,182	13,473
249	88	211	177	147	7	5	60	.....	242	286	1,472	10,507
258	80	351	193	206	34	10	108	4	.....	849	2,093	10,722
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	**1**	**3,607**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,185
1	.....	.....	8	.....	.....	.....	.....	.....	.....	.....	9	3,746
3	.....	17	.....	.....	.....	1	.....	.....	3	12	36	4,544
13	1	25	2	3	.....	3	1	.....	5	16	69	4,773
4	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	6	2,661
1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2	1,751
8	2	1	1	1	.....	1	1	.....	2	8	25	1,436
2	.....	.....	3	1	5	2	.....	4	.....	2	19	1,996
2	1	2	.....	2	2	1	4	.....	.....	7	21	1,488
38	**36**	**59**	**20**	**28**	**5**	.....	**80**	**3**	**62**	**204**	**535**	**2,132**
22	12	21	2	42	5	1	27	1	14	116	263	1,518
17	25	8	5	12	.....	2	12	2	6	81	170	1,188
23	18	17	9	11	.....	2	9	1	19	103	212	1,144
31	7	30	4	21	.....	6	17	3	30	74	223	1,158
18	3	18	1	9	1	6	33	3	18	69	179	666
49	6	34	1	18	4	2	32	1	38	101	286	724
81	12	70	5	59	8	1	60	6	46	197	545	844
26	18	60	7	61	3	1	63	3	60	289	591	801
19	10	48	.....	3	.....	.....	59	1	.....	37	177	407
280	**90**	**267**	**222**	**171**	**22**	**1**	**156**	**7**	**328**	**1,028**	**2,572**	**32,562**
295	49	246	238	160	16	3	76	2	223	755	2,063	31,506
501	102	420	245	278	34	17	126	6	306	1,225	3,260	42,915
579	118	443	309	311	11	24	108	4	339	1,280	3,526	46,286
541	60	377	186	247	5	20	208	12	347	1,525	3,528	48,237
536	46	229	95	255	10	15	167	10	276	1,054	2,693	35,295
541	130	329	153	298	14	8	208	8	390	1,024	3,103	30,216
842	203	479	352	419	42	28	189	14	548	1,380	4,496	32,971
557	174	378	308	331	48	9	172	13	375	834	3,199	30,734
520	150	500	244	347	79	13	352	12	.....	990	3,207	26,577
5,192	**1,122**	**3,668**	**2,352**	**2,817**	**281**	**138**	**1,762**	**88**	**3,132**	**11,095**	**31,647**	**357,299**

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TABLE 37.—***ALL MINES, 1919:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1919.*

State.	Number of employees.			Number killed.		
	Underground.	On the surface.	Total.	Underground.	On the surface.	Total.
Alabama	5,034	2,967	**8,001**	27	4	**31**
Alaska	1,144	1,932	**3,076**	9	1	**10**
Arizona	10,749	3,960	**14,709**	53	8	**61**
Arkansas	33	428	**461**	.....	.....	.....
California	4,383	1,681	**6,064**	15	3	**18**
Colorado	4,942	1,567	**6,509**	28	3	**31**
Connecticut	18	47	**65**	.....	.....	.....
Florida	.....	3,487	**3,487**	.....	5	**5**
Georgia	50	250	**300**	.....	.....	.....
Idaho	2,455	1,027	**3,482**	11	1	**12**
Illinois	398	241	**639**	2	.....	**2**
Iowa	475	75	**550**	.....	.....	.....
Kansas	707	278	**985**	3	.....	**3**
Kentucky	156	126	**282**	.....	1	**1**
Maine	.....	114	**114**	.....	.....	.....
Maryland	.....	58	**58**	.....	.....	.....
Massachusetts	25	4	**29**	.....	.....	.....
Michigan	19,361	8,925	**28,286**	71	10	**81**
Minnesota	7,769	8,337	**16,106**	25	20	**45**
Missouri	3,757	1,127	**4,884**	11	1	**12**
Montana	8,161	2,374	**10,535**	39	2	**41**
Nevada	2,573	1,467	**4,040**	16	5	**21**
New Hampshire	21	23	**44**	.....	.....	.....
New Jersey	1,327	515	**1,842**	8	.....	**8**
New Mexico	1,549	1,775	**3,324**	10	3	**13**
New York	2,341	1,201	**3,542**	11	1	**12**
North Carolina	197	249	**446**	1	.....	**1**
Ohio	256	25	**281**	.....	.....	.....
Oklahoma	3,805	1,161	**4,966**	16	1	**17**
Oregon	361	224	**585**	.....	.....	.....
Pennsylvania	38	312	**350**	.....	.....	.....
South Carolina [1]	.....	.....	.....	.....	.....	.....
South Dakota	811	196	**1,007**	4	1	**5**
Tennessee	1,368	1,840	**3,208**	5	1	**6**
Texas	204	1,505	**1,709**	1	2	**3**
Utah	3,057	1,542	**4,599**	9	6	**15**
Vermont	137	73	**210**	.....	.....	.....
Virginia	688	1,391	**2,079**	4	.....	**4**
Washington	561	431	**992**	1	.....	**1**
Wisconsin	1,794	707	**2,501**	8	.....	**8**
Wyoming	117	197	**314**	.....	1	**1**
Other States	9	592	**601**	.....	.....	.....
Total, 1919	**90,831**	**54,431**	**145,262**	**388**	**80**	**468**

[1] Not segregated.

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TABLE 38.—***ALL MINES:*** *Number of active operators, by States, 1916 to 1920.*

State.	1916	1917	1918	1919	1920
Alabama	22	42	38	31	23
Alaska	428	362	270	438	385
Arizona	445	450	321	304	299
Arkansas	23	38	21	12	10
California	840	628	389	293	283
Colorado	738	407	450	461	452
Connecticut	3	3	3	3	3
Florida	14	15	14	18	21
Georgia	26	29	20	18	16
Idaho	510	414	282	278	331
Illinois	7	11	8	10	7
Iowa	9	8	6	5	6
Kansas	29	28	26	19	21
Kentucky	8	25	15	13	14
Maine	4	5	[1]	4	5
Maryland	10	12	8	5	6
Massachusetts	3	3	3	3	3
Michigan	76	86	70	60	59
Minnesota	63	66	62	57	53
Missouri	159	210	101	45	35
Montana	328	284	216	195	196
Nevada	406	405	414	406	297
New Hampshire	3	6	9	5	[1]
New Jersey	7	6	6	6	6
New Mexico	123	135	92	89	90
New York	37	33	31	29	26
North Carolina	23	23	25	16	18
Ohio	5	4	[1]	3	3
Oklahoma	37	42	51	49	49
Oregon	210	183	140	104	118
Pennsylvania	21	19	18	14	10
South Carolina	3	3	[1]	[1]	[1]
South Dakota	65	64	48	38	35
Tennessee	25	32	37	24	24
Texas	11	12	14	11	11
Utah	223	233	178	125	177
Vermont	7	7	7	6	5
Virginia	27	36	40	30	24
Washington	176	168	112	106	110
Wisconsin	51	53	50	25	22
Wyoming	49	42	31	19	19
Other States	4	5	10	6	9
Total	**5,258**	**4,637**	**3,636**	**3,383**	**3,281**

[1] Not segregated.

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TABLE 39.—***ALL MINES:*** *Men employed and the equivalent in 300-day workers, 1916 to 1920.*

State.	Actual number.					Number 300-day workers.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
Alabama	7,360	9,088	7,975	8,001	7,122	7,208	8,464	7,993	8,111	7,101
Alaska	8,193	7,576	5,510	3,076	2,672	5,818	5,567	4,589	2,537	2,373
Arizona	21,421	22,492	19,391	14,709	14,628	21,664	22,464	21,555	14,503	15,510
Arkansas	1,012	1,573	795	461	855	787	1,359	582	402	802
California	13,295	10,123	9,750	6,064	4,889	12,561	11,390	9,750	5,627	4,721
Colorado	10,120	7,549	8,423	6,509	4,759	10,787	7,550	8,423	4,629	4,310
Connecticut	110	115	79	65	44	94	115	77	61	36
Florida	1,974	2,501	2,582	3,487	4,564	1,662	2,460	2,739	2,040	4,359
Georgia	604	915	745	300	526	394	805	601	226	351
Idaho	6,083	6,130	4,464	3,482	3,959	5,284	5,541	4,137	2,921	3,859
Illinois	509	677	665	639	697	418	608	579	587	675
Iowa	271	295	362	550	379	233	244	253	491	329
Kansas	615	901	1,112	985	1,319	524	690	804	890	1,170
Kentucky	278	705	504	282	438	122	478	441	164	379
Maine	60	113	[1]	114	129	56	112	[1]	95	97
Maryland	143	129	70	58	69	70	118	53	51	64
Massachusetts	34	51	33	29	34	28	49	31	27	32
Michigan	34,061	32,523	33,236	28,286	24,614	34,031	32,036	32,914	27,112	24,351
Minnesota	19,152	21,820	20,378	16,106	16,139	16,233	20,706	19,704	14,548	16,112
Missouri	14,334	12,006	6,063	4,884	4,133	13,067	10,107	5,250	3,627	4,340
Montana	19,491	16,264	17,858	10,535	10,800	19,310	16,218	18,266	10,503	10,877
Nevada	7,953	6,855	5,689	4,040	3,770	7,271	6,863	6,827	4,847	3,840
New Hampshire	34	81	92	44	[1]	31	71	63	33	[1]
New Jersey	2,031	2,192	2,201	1,842	1,746	2,079	2,065	2,200	1,726	1,531
New Mexico	4,182	4,974	3,994	3,324	3,214	3,938	4,973	3,886	3,252	3,099
New York	3,662	3,905	3,648	3,542	3,167	3,496	4,189	3,481	3,324	2,979
North Carolina	695	967	569	446	399	558	693	449	434	341
Ohio	262	221	[1]	281	198	232	133	[1]	271	187
Oklahoma	1,593	2,894	3,545	4,966	4,042	1,163	2,102	2,816	4,646	3,593
Oregon	1,308	1,186	1,287	585	510	894	817	843	467	355
Pennsylvania	460	514	336	350	331	387	455	291	311	319
South Carolina	153	233	[1]	[1]	[1]	140	168	[1]	[1]	[1]
South Dakota	2,491	2,160	1,515	1,007	1,532	2,616	2,361	1,664	1,063	1,763
Tennessee	3,836	3,535	3,601	3,208	2,813	3,306	3,204	3,175	2,820	2,644
Texas	943	618	1,414	1,709	1,724	1,105	635	1,630	1,863	2,029
Utah	7,384	7,933	6,901	4,599	4,965	7,817	8,620	7,825	4,991	5,083
Vermont	155	153	140	210	100	142	128	139	160	99
Virginia	2,919	2,670	2,150	2,079	1,483	2,512	2,395	1,896	1,661	1,365
Washington	1,239	1,098	871	992	855	694	745	613	777	787
Wisconsin	3,574	3,789	3,058	2,501	2,157	3,126	3,336	2,794	2,221	1,916
Wyoming	501	526	403	314	295	388	436	340	227	233
Other States	190	529	1,197	601	513	209	615	1,333	625	529
Total	**204,685**	**200,579**	**182,606**	**145,262**	**136,583**	**192,455**	**192,085**	**181,006**	**134,871**	**134,540**

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TABLE 40.—***ALL MINES:*** *Days of labor performed and average number of days mines were operated, by States, 1916 to 1920.*

State.	Days of labor performed.					Average days active.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
Alabama	2,162,392	2,539,347	2,397,912	2,433,203	2,130,352	294	279	301	304	299
Alaska	1,745,476	1,670,175	1,376,571	760,970	711,942	213	220	250	247	266
Arizona	6,499,137	6,739,067	6,466,550	4,350,754	4,652,982	303	300	333	296	318
Arkansas	236,074	407,830	174,515	120,495	240,625	233	259	220	261	281
California	3,768,322	3,417,101	2,925,110	1,688,200	1,416,340	283	338	300	278	290
Colorado	3,236,196	2,264,883	2,526,935	1,388,616	1,292,861	320	300	300	213	272
Connecticut	28,229	34,456	23,030	18,400	10,752	257	300	292	283	244
Florida	498,605	737,887	821,690	612,081	1,307,584	253	295	318	176	286
Georgia	118,198	241,366	180,233	67,901	105,289	196	264	242	226	200
Idaho	1,585,121	1,662,271	1,241,089	876,233	1,157,655	261	271	278	252	292
Illinois	125,479	182,389	173,604	175,992	202,429	247	269	261	275	290
Iowa	69,959	73,304	75,997	147,241	98,560	258	248	210	268	260
Kansas	157,194	206,850	241,166	266,917	351,016	256	230	217	271	266
Kentucky	36,630	143,401	132,422	49,052	113,730	132	203	263	174	260
Maine	16,948	33,450	(1)	28,506	29,246	282	296	(1)	250	227
Maryland	20,909	35,412	15,780	15,386	19,100	146	275	225	265	277
Massachusetts	8,410	14,803	9,340	8,135	9,532	247	290	283	281	280
Michigan	10,209,502	9,610,957	9,874,061	8,133,432	7,305,354	300	296	297	302	297
Minnesota	4,870,007	6,211,912	5,911,146	4,364,428	4,833,593	254	285	290	271	299
Missouri	3,920,002	3,032,204	1,575,149	1,088,070	1,302,038	273	253	260	223	315
Montana	5,793,114	4,865,567	5,479,838	3,150,920	3,263,225	297	299	307	299	302
Nevada	2,181,188	2,059,054	2,047,980	1,454,010	1,151,920	274	300	360	360	306
New Hampshire	9,288	21,205	18,936	9,927	(1)	273	262	206	226	(1)
New Jersey	623,793	619,640	659,978	517,881	459,246	307	283	300	281	263
New Mexico	1,181,330	1,491,783	1,165,899	975,692	929,640	282	300	292	294	289
New York	1,048,875	1,256,601	1,044,184	997,095	893,550	286	322	286	282	282
North Carolina	167,282	207,936	134,698	130,241	102,197	241	215	237	292	256
Ohio	69,570	40,040	(1)	81,391	56,155	266	181	(1)	290	284
Oklahoma	348,759	630,504	844,840	1,393,892	1,077,911	219	218	238	281	267
Oregon	268,056	245,038	252,942	140,000	106,477	205	207	197	239	209
Pennsylvania	116,162	136,590	87,262	93,400	95,820	253	266	260	267	289
South Carolina	41,975	50,400	(1)	(1)	(1)	274	216	(1)	(1)	(1)
South Dakota	784,715	708,364	499,300	319,010	529,032	315	328	330	317	345
Tennessee	991,838	961,148	952,359	846,100	793,155	259	272	264	264	282
Texas	331,399	190,495	489,154	559,015	608,822	351	308	346	327	353
Utah	2,345,007	2,586,036	2,347,633	1,497,423	1,524,810	318	326	340	326	307
Vermont	42,557	38,487	41,766	48,033	29,873	275	252	298	229	299
Virginia	753,543	718,380	568,689	498,119	409,504	258	269	265	240	276
Washington	208,164	223,421	183,963	233,181	236,152	168	203	211	235	276
Wisconsin	937,859	1,000,661	838,294	666,269	574,811	262	264	274	266	266
Wyoming	116,261	130,770	101,943	68,173	69,953	232	249	253	217	237
Other States	62,900	184,626	399,790	187,566	158,660	331	349	334	312	309
Total	**57,736,425**	**57,625,811**	**54,301,748**	**40,461,350**	**40,361,893**	**282**	**287**	**297**	**281**	**296**

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TABLE 41.—***ALL MINES:*** *Fatalities and injuries, by States and years, 1916 to 1920.*

State.	Number killed.					Number injured.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
Alabama	27	32	25	31	25	2,013	2,247	1,536	1,392	1,548
Alaska	29	30	8	10	7	657	543	206	333	257
Arizona	68	80	86	61	52	7,340	7,860	10,460	6,466	6,375
Arkansas	1	.....	1	.....	2	130	75	36	22	85
California	42	44	54	18	26	3,751	2,888	3,160	1,651	1,138
Colorado	63	47	39	31	25	1,457	1,074	849	578	668
Connecticut	.....	.....	.....	.....	1	2	13	5	2	1
Florida	4	7	3	5	17	164	262	211	267	742
Georgia	4	4	1	.....	.....	44	66	17	5	18
Idaho	15	24	17	12	12	915	1,044	868	633	1,101
Illinois	4	3	3	2	5	189	151	72	80	95
Iowa	1	.....	.....	.....	.....	53	67	47	51	51
Kansas	3	4	6	3	3	105	81	142	368	413
Kentucky	.....	.....	2	1	.....	38	41	47	23	42
Maine	.....	.....	.....	.....	.....	4	1	(1)	31	12
Maryland	.....	.....	.....	.....	.....	11	2	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	3	.....	1	1	.....
Michigan	128	109	109	81	49	9,310	8,625	6,543	5,611	5,296
Minnesota	42	63	64	45	42	3,692	4,473	3,833	3,289	2,970
Missouri	35	36	12	12	12	3,005	2,384	1,566	634	753
Montana	75	214	64	41	45	5,344	3,978	4,401	2,505	2,513
Nevada	30	31	33	21	12	1,451	1,124	1,191	447	594
New Hampshire	.....	.....	1	.....	.....	.....	4	2	.....	.....
New Jersey	8	9	10	8	1	421	377	325	304	201
New Mexico	21	13	15	13	7	717	996	669	814	652
New York	16	13	14	12	14	1,311	1,043	827	1,037	1,183
North Carolina	.....	1	2	1	1	115	106	51	50	33
Ohio	1	.....	.....	.....	.....	34	39	(1)	40	67
Oklahoma	5	18	13	17	11	301	923	1,271	1,337	1,629
Oregon	1	1	4	.....	1	84	123	124	61	126
Pennsylvania	4	.....	1	.....	.....	42	74	17	18	16
South Carolina	.....	.....	(1)	(1)	.....	1	8	(1)	(1)	(1)
South Dakota	6	7	1	5	5	739	730	476	398	468
Tennessee	11	11	13	6	5	696	627	436	744	841
Texas	2	.....	4	3	6	262	83	233	423	435
Utah	24	26	28	15	27	2,262	2,385	2,119	1,165	1,516
Vermont	2	.....	.....	.....	2	30	49	46	24	18
Virginia	3	8	5	4	1	273	262	152	147	81
Washington	3	4	.....	1	3	48	280	65	91	79
Wisconsin	17	12	8	8	5	1,100	1,031	721	395	450
Wyoming	1	1	.....	1	.....	39	12	15	7	29
Other States	1	.....	.....	.....	1	84	135	175	62	66
Total	**697**	**852**	**646**	**468**	**425**	**48,237**	**46,286**	**42,915**	**31,506**	**32,562**

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TABLE 42.—***ALL MINES:*** *Fatalities and injuries per 1,000 300-day workers employed, by States, 1916 to 1920.*

State.	Number killed, per 1,000 300-day workers.					Number injured, per 1,000 300-day workers.				
	1916	1917	1918	1919	1920	1916	1917	1918	1919	1920
Alabama	3.75	3.78	3.13	3.82	3.52	279.27	265.48	192.17	171.62	218.00
Alaska	4.98	5.39	1.74	3.94	2.95	112.93	97.54	44.89	131.26	108.28
Arizona	3.14	3.56	3.99	4.21	3.35	338.81	349.89	485.27	445.84	411.02
Arkansas	1.27	.....	1.72	.....	2.49	165.18	55.19	61.86	54.73	105.99
California	3.34	3.86	5.54	3.20	5.51	298.62	253.56	324.10	293.41	241.05
Colorado	5.84	6.23	4.63	6.70	5.80	135.07	142.25	100.80	124.86	154.99
Connecticut	.....	.....	.....	.....	27.78	21.28	113.04	64.94	32.79	27.78
Florida	2.41	2.85	1.10	2.45	3.90	98.68	106.50	77.04	130.88	170.22
Georgia	10.15	4.97	1.66	.....	.....	111.68	81.99	28.29	22.12	51.28
Idaho	2.84	4.33	4.11	4.11	3.11	173.16	188.41	209.81	216.71	285.31
Illinois	9.57	4.93	5.18	3.41	7.41	452.15	248.36	124.35	136.29	140.74
Iowa	4.29	.....	.....	.....	.....	227.47	274.59	185.77	103.87	155.02
Kansas	5.73	5.80	7.46	3.37	2.56	200.38	117.39	176.62	413.48	352.99
Kentucky	.....	.....	4.54	6.10	.....	311.48	85.77	106.58	140.24	110.82
Maine	.....	.....	.....	.....	.....	71.43	8.93	(1)	326.32	123.71
Maryland	.....	.....	.....	.....	.....	157.14	16.95	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	107.14	.....	32.26	37.04	.....
Michigan	3.76	3.40	3.31	2.99	3.25	273.57	269.23	198.79	206.96	217.49
Minnesota	2.59	3.04	3.25	3.09	2.61	227.44	216.02	194.53	226.08	184.33
Missouri	2.68	3.56	2.29	3.31	2.76	229.97	235.88	298.29	174.80	173.50
Montana	3.88	13.20	3.50	3.90	4.14	276.75	245.28	240.94	238.50	231.04
Nevada	4.13	4.52	4.83	4.33	3.13	199.56	163.78	174.45	92.22	154.69
New Hampshire	.....	.....	15.87	.....	.....	.....	56.34	31.75	.....	.....
New Jersey	3.85	4.36	4.55	4.63	.65	202.50	182.57	147.73	176.13	131.29
New Mexico	5.33	2.61	3.86	4.00	2.26	182.07	200.28	172.16	250.31	210.39
New York	4.58	3.10	4.02	3.61	4.70	375.00	248.99	237.58	311.97	397.11
North Carolina	.....	1.44	4.45	2.30	2.93	206.09	152.96	113.59	115.21	96.77
Ohio	4.31	.....	.....	.....	.....	146.55	293.23	(1)	147.60	358.29
Oklahoma	4.30	8.56	4.62	3.66	3.06	258.81	439.11	451.35	287.77	453.38
Oregon	1.12	1.22	4.74	.....	2.82	93.96	150.55	147.09	130.62	354.93
Pennsylvania	10.34	.....	3.44	.....	.....	108.53	162.64	58.42	57.88	50.16
South Carolina	.....	.....	(1)	(1)	.....	71.43	47.62	(1)	(1)	.....
South Dakota	2.29	2.96	.60	4.70	2.84	282.49	309.19	286.06	374.41	265.46
Tennessee	3.33	3.43	4.09	2.13	1.89	210.53	195.69	137.32	263.83	318.08
Texas	1.81	.....	2.45	1.61	2.96	237.10	130.71	142.86	227.05	214.39
Utah	3.07	3.02	3.58	3.01	5.31	289.37	276.68	270.80	233.42	298.25
Vermont	14.08	.....	.....	.....	20.20	211.27	382.81	330.94	150.00	181.82
Virginia	1.19	3.34	2.64	2.41	.73	108.68	109.39	80.17	88.50	59.34
Washington	4.32	5.37	.....	1.29	3.81	69.16	375.84	106.04	117.12	100.38
Wisconsin	5.44	3.60	2.86	3.60	2.61	351.89	309.05	258.05	177.85	234.86
Wyoming	2.58	2.29	.....	4.41	.....	100.52	27.52	44.12	30.84	124.46
Other States	4.78	.....	.....	.....	1.89	401.91	219.51	131.28	99.20	124.76
Total	**3.62**	**4.44**	**3.57**	**3.47**	**3.16**	**250.64**	**240.97**	**237.09**	**233.60**	**242.02**

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TABLE 43.—*Fatal and serious accidents per 10,000 shifts for Butte mines of the Anaconda Copper Mining Co. during six years, 1915 to 1920, inclusive.*

Order of merit.	Mine.	1915		1916		1917		1918		1919		1920		Total, six years.		
		Shifts.	Rate.	Shifts.	Rate.	Shifts.	Rate.	Shifts.	ate.	Shifts.	Rate.	Shifts.	Rate.	Shifts.	Acci-dents.	Rate.
1	Reins									32,291.50	0.619	73,908.75	0.541	106,200.25	6	0.564
2	East Colusa	28,808.00	0.694	35,557.00	0.0	33,647.00	0.297	39,071.50	0.519	35,160.75	1.137	48,609.00	1.234	220,853.25	15	.679
3	High Ore	218,637.00	.777	317,325.00	.535	154,102.50	.713	151,974.75	1.316	60,640.75	.494	79,626.50	1.004	982,306.50	76	.773
4	Leonard	235,694.00	1.230	285,313.00	.560	218,619.50	.777	195,693.75	.817	105,313.00	.379	160,703.25	.933	1,201,336.50	97	.807
5	Silver Bow	52,344.00	1.146	56,711.00	.176	47,993.25	1.041	50,485.50	.792	16,277.75	1.257	9,138.50	2.188	232,950.00	20	.858
6	Bonanza			1,527.00	6.548	7,618.50	1.316	10,885.50	.0	3,035.50	.0			23,066.50	2	.867
7	Tropic	6,675.00	1.498	27,371.00	.365	19,717.50	.507	21,766.25	.459	23,141.00	1.728	14,663.00	1.363	113,333.75	10	.883
8	Poulin	24,533.00	.0	84,192.00	.237	88,830.75	.675	102,292.00	1.075	53,710.50	1.493	73,488.75	1.768	427,047.00	40	.936
9	Mtn. View	198,630.00	.805	290,789.00	1.031	260,200.00	.922	288,609.25	.866	22,320.50	.448	78,750.00	2.007	1,139,298.75	112	.983
10	Never Sweat	43,334.00	.430	157,497.00	.952	118,628.00	1.011	136,715.00	1.243	50,848.75	1.179	30,691.25	.651	537,714.00	53	.985
11	Alice	875.00	.0	22,967.00	.388	23,502.00	.701	19,447.50	1.548	21,246.50	1.411	24,305.75	.411	112,343.75	12	1.068
12	Belmont	46,629.00	.857	88,430.00	.678	45,448.00	1.320	26,336.50	.759	11,626.00	.0	34,683.50	2.883	253,153.00	28	1.106
13	Lexington	11,812.00	1.694	59,423.00	1.177	32,682.00	.917	27,498.75	1.093	2,439.00	.0	1,300.00	.0	135,154.75	15	1.109
14	Bell	143,250.00	1.535	197,826.00	.909	139,900.75	.929	179,787.00	1.001	103,014.00	1.747	38,571.50	1.037	802,349.25	93	1.159
15	Anaconda	252,024.00	1.706	263,034.00	.760	210,917.00	.806	249,856.50	1.280	55,620.75	1.977	33,527.00	.298	1,064,979.25	124	1.174
16	Badger State	176,512.00	2.152	231,282.00	1.124	214,745.25	.791	289,353.25	.967	241,084.25	.954	214,457.75	1.398	1,367,434.50	162	1.184
17	Southern Cross	68,217.00	.586	65,511.00	.610	51,768.25	1.545	35,605.50	3.089	28,712.75	.696	704.00	14.204	250,518.50	30	1.197
18	Original	187,071.00	1.870	215,023.00	1.116	204,392.50	.929	258,131.00	1.239	36,773.25	.815	40,721.75	1.473	942,112.50	119	1.263
19	West Gray Rock	60,741.00	1.317	68,133.00	.880	54,957.00	.910	62,248.75	1.767	29,992.25	1.667	37,067.50	1.888	113,139.50	42	1.341
20	West Colusa	153,022.00	1.437	205,253.00	.799	199,213.50	1.305	241,604.00	1.407	177,415.50	.634	183,795.75	1.795	1,160,303.75	160	1.378
21	Moonlight	13,253.00	.0	88,019.00	1.590	77,016.00	1.558	49,101.50	1.221	10,932.50	1.829	7,223.25	.0	245,545.25	34	1.384
22	Pennsylvania	134,193.00	1.117	165,901.00	2.049	187,537.50	1.173	249,921.25	1.040	59,448.00	1.513	63,054.25	2.220	860,055.00	120	1.395
23	Tramway	240,180.00	1.582	302,276.00	1.124	150,763.50	1.132	161,082.25	1.365	136,537.00	1.831	125,986.25	2.063	1,116,825.00	162	1.450
24	Emma	4,687.00	.0	24,545.00	.407	30,994.00	1.613	54,349.50	.919	28,891.25	2.076	64,547.00	2.168	208,013.75	13	1.490
25	Mtn. Con	123,494.00	1.863	177,175.00	.790	127,158.50	1.966	61,293.50	1.794	46,825.75	.640	55,751.25	2.511	591,698.00	90	1.521
26	St. Lawrence	137,145.00	1.458	117,361.00	1.022	57,598.75	2.083	108,961.75	1.743	52,026.50	1.922	25,956.75	1.926	499,049.75	78	1.562
27	Steward	139,403.00	1.721	134,263.00	.595	107,997.50	1.203	131,534.00	.836	132,405.00	2.794	94,079.50	2.976	739,682.00	121	1.635
28	Berkeley	83,693.00	2.031	109,381.00	1.462	95,620.50	.836	143,925.50	1.667	121,940.75	1.968	36,691.75	2.725	591,252.50	99	1.675
29	Liquidator					2,101.75	4.758	8,609.50	2.323	5,561.00	.0	1,611.00	.0	17,883.25	3	1.677
30	J. I. C	5,038.00	1.984											5,038.00	1	1.984
31	Nettie	5,040.00	.0	18,204.00	2.197	25,094.00	1.195	42,168.25	.897	39,430.00	3.550	45,122.50	2.659	175,058.75	41	2.342
32	Orphan girl							6,606.75	1.513	10,346.25	5.799	8,118.00	2.463	25,071.00	9	3.589
	Total	2,794,934.00	1.388	3,810,289.00	0.913	2,988,765.25	1.050	3,404,916.00	1.218	1,755,008.25	1.504	1,706,855.00	1.675	16,460,767.50	2,005	1.218

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Number of fatal accidents included above for all mines, by years.

Total fatal accidents.	Number.
1915	27
1916	46
1917	39
1918	41
1919	25
1920	22
Total (6 years)	200
Rate	0.121

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SIX-YEAR ACCIDENT RECORD OF MINES OF THE ANACONDA COPPER MINING COMPANY IN MONTANA.

By D. Harrington.

A tabulation is printed on page 90 showing the accident record of the 32 mines of the Anaconda Copper Mining Co., in Montana, for the years 1915, 1916, 1917, 1918, 1919, and 1920, with summation for the six years. The table gives the number of shifts worked by each mine with the serious plus fatal accident rate for each 10,000 shifts worked.

In a total of 16,460,767.5 shifts worked by employees of the company's mines during the six-year period, there were only 2,005 serious and fatal accidents, and of these, 200 were fatalities, leaving 1,805 serious accidents (a serious accident being one in which 14 or more days' time is lost). This is at a rate of 9,120 shifts per serious accident and 82,304 shifts per fatality. Hence, if 300 days be adopted as a year's work, there would be one fatality per 274.3 years of work in these mines and one serious accident for every 30.4 years work.

According to Technical Paper 286,[1] during the years 1916, 1917, 1918, and 1919, the metal mines of the United States worked a total of 210,548,640 shifts and had 39,705 serious accidents. During the same years, according to the following tabulation, the mines of the Anaconda Copper Mining Co. worked 11,958,978 shifts and had a serious accident rate of 0.995 accidents per 10,000 shifts worked. If the metal mines of the United States, working these 210,548,640 shifts, had this company's rate of 0.995 serious accidents per 10,000 shifts, the total number of serious accidents would have been only 21,000, that is the serious accidents in metal mines would have been reduced nearly one-half, or by 18,705.

The table shows that almost exactly one-tenth of the total serious and fatal accidents in the 32 mines were fatalities. The fatal-accident rate of 0.121 per 10,000 shifts is very similar to the country's metal-mine record, this being 0.121, 0.148, 0.119, and 0.114 fatalities per 10,000 shifts worked for all the metal mines of the United States for the years 1916, 1917, 1918, and 1919, respectively.

Not only the company's copper mines, but also those mines whose chief product is gold ore, or silver ore or silver and lead, or zinc, or manganese are covered by the table. Some of the smaller mines are shallow (less than 1,000 feet in depth), many of the mines are comparatively deep (over 2,000 feet), and several have mined ore below the 3,000-foot level. Some of the mines were heavy producers of ore, some were chiefly in the development stage; two (the Leonard and High Ore) have the main pumping plants for nearly all the mines

[1] Adams, W. W., Metal-mine accidents in the United States during the calendar year 1919. Tech. Paper 286, Bureau of Mines, 1921, 99 pp.

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of the Butte district, and at times also produce ore; the Reins is occupied wholly with fire fighting and slime filling of fire regions of the West Colusa, Leonard, and Tramway mines.

The accident rate for all the metal mines of the United States during the six-year period averages about 2,000 fatal plus serious accidents per 10,000 shifts; the tabulation shows that for the six-year period only two of the 32 mines operated by the Anaconda company in Montana, have exceeded this average, and one of these is a small mine that had a total of 9 accidents. Even the yearly records of these mines show comparatively few instances of individual mines exceeding the country's average of approximately 2,000 serious plus fatal accidents per 10,000 shifts.

The best record of the 32 mines is held by the Reins. Although in that mine, most of the working places were on levels, and hence were not subject to the usual metal-mine accident hazards, the record is the more remarkable when one considers that the work in this mine is in connection with fire fighting where high temperatures, dangerous gases, broken ground, and other dangerous conditions are almost constantly encountered, and much of the work has been done by men wearing oxygen-breathing apparatus. The very good record of mines that worked a large number of shifts, such as the High Ore, Leonard, Poulin, Mountain View, Never Sweat, Bell, Anaconda, Badger, and others, deserves the strongest commendation, as most of these mines are deep, have hot workings, and have been heavy producers, yet have taken time to devote much attention to the forwarding of safety. The record for these mines of 1,218 serious and fatal accidents per 10,000 shifts worked for the six-year period is the more remarkable when compared with that of a large mine in the West, where, during a recent year, there were about 200,000 shifts worked and the fatal plus serious accident record averaged 12.38 per 10,000 shifts worked, or more than ten times the record of the Anaconda Copper Mining Co.

It is the opinion of the writer that the especially good record of 1916 and 1917—attained even though everything was working at maximum capacity—was brought about largely by the rigid discipline then in effect in regard to safety matters. This rigid discipline was in large measure relaxed in 1918, 1919, and 1920 by this company in common with practically all employers throughout the United States, and the effect of this relaxation is evident in the considerably increased accident rate of those years. The good record of these mines does not come from good luck, nor does it come without effort. There has been established an efficient safety organization and safety methods, equipment, practices, etc., have been forwarded by considerable expenditure of money and by much thought, time, and effort by the men in charge of the company's operations.

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STATE MINE INSPECTORS,[1] GEOLOGISTS, AND OTHER MINE OFFICIALS IN THE UNITED STATES.

January 1, 1922.

ALABAMA.

Name.	Designation.	Address.
Charles H. Nesbitt	Chief mine inspector	421–423 Chamber of Commerce, Birmingham.
Eugene A. Smith	State geologist, University of Alabama	University.

ALASKA.

B. W. Dyer	United States mine inspector	Fairbanks.
B. D. Stewart	Territorial mine inspector	Juneau.

ARIZONA.

G. M. Butler	Director, State bureau of mines	Tucson.
J. F. White	State mine inspector	Phoenix.
E. F. Myers	Deputy mine inspector	Bisbee.
J. F. McManis	do	Globe.
Matthew Hall	do	Prescott.
Carl Lausen	Geologist, University of Arizona	Tucson.

ARKANSAS.

James G. Ferguson	Commissioner of mines, manufactures, and agriculture.	Little Rock.
Jess Redyard	State mine inspector	413, 414 First National Bank Building, Fort Smith.
Gilbert H. Cady	State geologist, University of Arkansas	Fayetteville.

CALIFORNIA.

Will J. French	Chairman, industrial accident commission	525 Market Street, San Francisco.
H. M. Wolflin	Superintendent of safety	Do.
G. Chester Brown	Chief mining engineer	Do.
J. Wesley Gebb	Mining engineer	Do.
F. L. Lowell	do	Do.
F. McN. Hamilton	State mineralogist, California State mining bureau	Ferry Building, San Francisco.
E. S. Boalich	Mining engineer, California State mining bureau	Do.

COLORADO.

Horace F. Lunt	Commissioner, bureau of mines, State of Colorado	Denver.
Melvin J. Collins	Secretary	Do.
T. R. Henahen	Inspector, district No. 1	Do.
M. J. McCarthy	Inspector, district No. 2	Cripple Creek.
R. J. Murray	Inspector, district No. 3	Leadville.
Robert Innes	Inspector, district No. 4	Montrose.
James Dalrymple	Chief inspector of coal mines	State capitol, Denver.
Russell D. George	State geologist, University of Colorado	Boulder.

CONNECTICUT.

Prof. Henry H. Robinson	Superintendent, State geological and natural history survey, Yale University.	New Haven.

FLORIDA.

Herman Gunter	State geologist, Florida State geological survey	Tallahassee.

GEORGIA.

S. W. McCallie	State geologist, geological survey of Georgia	Atlanta.

HAWAII.

Charles T. Bailey	Commissioner of public lands	Honolulu.

[1] This report being for metal mines, only the chief of the coal-mine inspection service is listed herein.

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IDAHO.

Name.	Designation.	Address.
Stewart Campbell	State mine inspector, mining department	Boise.
Francis A. Thomson	Director bureau of mines and geology and dean, school of mines, University of Idaho.	Moscow.

ILLINOIS.

Robt. M. Medill	Director, department of mines and minerals	Springfield.
Martin Bolt	Assistant director	Do.
Frank W. De Wolf	Chief, State geological survey, division department of registration and education.	Urbana.
William Hall	President, miners' examining board	Springfield.

INDIANA.

Samuel R. Artman	Chairman, industrial board of Indiana	Room 432, State capitol, Indianapolis.
Cairy Littlejohn	Chief mine inspector	Room 413, State capitol, Indianapolis.
W. N. Logan	State geologist, department of geology and natural resources.	Indianapolis.

IOWA.

E. M. Gray	President, Iowa State mining board	Des Moines.
B.H. Shivers	Secretary, Iowa State mining board	Do.
W . E. Holland	Inspector, district No. 1	Albia.
R. T. Rhys	Inspector, district No. 2	Ottumwa.
Edward Sweeney	Inspector, district No. 3	Des Moines.
W. H. Wier	Secretary to mine inspectors	Do.
George F. Kay	Director, Iowa geological survey	Iowa City.

KANSAS.

James Sherwood	Chief engineer of mining	Pittsburg.
Raymond C. Moore	State geologist, University of Kansas	Lawrence.

KENTUCKY.

L. Blenkinsopp	Chief inspector of mines	Lexington.
W. R. Jillson	State geologist	Frankfort.

MARYLAND.

Frank Powers	State mine inspector	Frostburg.
Edward B. Mathews	State geologist, Maryland geological survey, Johns Hopkins University.	Baltimore.

MICHIGAN.

Richard H. Fletcher	Commissioner, department of labor	Lansing.
Maurice D. Kirby	Chief clerk	Do.
Perry J. Ward	Deputy commissioner, department of labor	Do.
Arthur K. Smith	Coal-mine inspector	613 North Sherman Street, Bay City.
John C. Clemans	Mine inspector for Gogebic County	Bessemer.
Swan Oleson	Deputy mine inspector for Gogebic County	Do.
Mat Salo	do	Ironwood.
John Brickman	Mine inspector for Keweenaw County	Ahmeek.
Gust. Keikkala	Deputy mine inspector for Keweenaw County	Mohawk.
Alfred James	Mine inspector for Houghton County	Laurium.
John Allaria	Deputy mine inspector for Houghton County	Calumet.
Harry J. King	do	Laurium.
Michael Pakkala	do	Atlantic mine.
Fred Mitchell	Mine inspector for Iron County	Iron River.
James H. Yelland	Mine inspector for Marquette County	Ishpeming.
Frank L. Larson	Mine inspector for Dickinson County	Iron Mountain.
Robt. Eva, sr	Mine inspector for Ontonagon County	Greenland.
John P. Christopher	Mine inspector for Baraga County	602 Pine Street, Marquette.
Richard A. Smith	Chief, Michigan geological and biological survey	Lansing.

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MINNESOTA.

Name.	Designation.	Address.
John P. Gardiner	Commissioner of labor and industries	St. Paul.
Oscar M. Sullivan	Chief statistician of labor and industries	Do.
Ed. Smith	Mine inspector for St. Louis County	Eveleth.
W. J. Trescott	Mine inspector for Itasca County	Coleraine.
August Swanson	Mine inspector for Crow Wing County	Brainerd.
F. A. Wildes	Chief inspector of mines, State and school lands	Hibbing.
W. H. Emmons	Director, Minnesota geological survey, University of Minnesota.	Minneapolis.

MISSISSIPPI.

E. N. Lowe	Director, Mississippi geological survey	Jackson.

MISSOURI.

J. E. Roberts	Chief mine inspector	Kirksville.
W. H. Crouch	Secretary, State bureau of mines and mining	Bethany.
C. C. Keith	Inspector of lead and zinc mines	Joplin.
R. C. Detchmendy	do	Flat River.
C. M. Harlan	do	Carterville.
J. A. Galbraith	do	Webb City.
H. A. Buehler	State geologist and director, bureau of geology and mines.	Rolla.

MONTANA.

Jerome G. Locke	Chairman, State industrial accident board	Helena.
George N. Griffin	State coal-mine inspector	Do.
William Maxwell	State metal-mine inspector	Do.
J. P. Rowe	State geologist, University of Montana	Missoula.

NEBRASKA.

E. H. Barbour	State geologist, University of Nebraska	Lincoln.

NEVADA.

George D. Smith	Chairman, Nevada industrial commission	Carson City.
A. J. Stinson	State mine inspector	Do.
Charles Huber	Deputy mine inspector	Tonopah.
Alex. Baird	do	Ely.

NEW JERSEY.

John Roach	Chief, bureau of mines, department of labor	State House, Trenton.
Augustus Munson	State mine inspector	P. O. box 311, Dover.
H. B. Kümmel	State geologist, division of geology and waters, department of conservation and development.	Trenton.

NEW MEXICO.

W. W. Risdon	State inspector of mines	709 W. Roma, Albuquerque.
R. W. Ellis	State geologist, University of New Mexico	Albuquerque.

NEW YORK.

Henry D. Sayer	State industrial commissioner	124 East Twenty-eighth Street, New York.
W. W. Jones	Mine inspector, State industrial commission	Albany.
Robert W. Jones	Inspector of mines and tunnels, State industrial commission.	124 East Twenty-eighth Street, New York.
Gustav Werner	Tunnel inspector, State industrial commission	Do.
John M. Clarke	State geologist, University of the State of New York.	Albany.

NORTH CAROLINA.

M L. Shipman	Commissioner of labor and printing	Raleigh.
Joseph Hyde Pratt	State geologist, North Carolina geological and economic survey.	Chapel Hill.

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NORTH DAKOTA.

Name.	Designation.	Address.
W. H. Robinson	State engineer	Bismarck.
John Hanwell	State mine inspector	Post office box 271, Bismarck.
A. G. Leonard	State geologist, State geological survey, University of North Dakota.	Grand Forks.

OHIO.

Percy Tetlow	Director, department of industrial relations	Columbus.
W. Robinett	Chief division of mines	Do.
J. A. Bownocker	State geologist, geological survey of Ohio	Do.

OKLAHOMA.

Ed. Boyle	Chief mine inspector (mines, oil, and gas)	McAlester.
C. W. Shannon	Director Oklahoma geological survey	Norman.

OREGON.

J. W. Ferguson	Chairman, State industrial accident commission	Salem.
Henry M. Parks	Director, Oregon bureau of mines and geology	417 Oregon Building, Portland.

PENNSYLVANIA.

Seward E. Button	Chief, department of mines	Harrisburg.
Frank Hall	Deputy, department of mines	Do.
Edward C. Malick	Chief clerk, department of mines	Do.
Geo. H. Ashley	State geologist, bureau of topography and geological survey.	Do.

SOUTH CAROLINA.

Stephen Taber	State geologist	Columbia.

SOUTH DAKOTA.

Otto Ellerman	State mine inspector	Lead.
Freeman Ward	State geologist, State geological and natural history survey.	Vermilion.

TENNESSEE.

O. P. Pile	Chief mine inspector	Nashville.
Wilbur A. Nelson	State geologist, Tennessee State geological survey	Do.

TEXAS.

B. S. Gentry	State mine inspector	Post office box, 327, Rockdale.
J. A. Udden	Director, bureau of economic geology and technology.	Austin.

UTAH.

Preston A. Thatcher	Chairman, industrial commission of Utah	State capitol, Salt Lake City.
John Crawford	Coal-mine inspector	Do.
H. G. Snyder	Metal-mine inspector	Do.
Carl A. Allen	Mining engineer for the industrial commission of Utah.	Do.
Wm. Peterson	State geologist, Agricultural College of Utah	Logan.

VERMONT.

Geo. H. Perkins	State geologist, University of Vermont	Burlington.

VIRGINIA.

John Hirschberg	Commissioner, bureau of labor and industrial statistics.	Richmond.
A. G. Lucas	State inspector of mines, bureau of labor and industrial statistics.	Do.
Thomas L. Watson	Director and State geologist, Virginia geological survey.	Charlottesville.

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WASHINGTON.

Name.	Designation.	Address.
Abe Morris	State mine inspector	Perkins Building, Tacoma.
Prof. Solon Shedd	Supervisor of geology, State College of Washington	Pullman.

WEST VIRGINIA.

R. M. Lambie	Chief, department of mines	Charleston.
I. C. White	State geologist, West Virginia geological survey	Morgantown.

WISCONSIN.

R. McA. Keown	Engineer, industrial commission	Madison.
Arthur H. Findeisen	Mine inspector, industrial commission	Do.
W. O. Hotchkiss	Director, geological and natural history survey	Do.

WYOMING.

R. T. Sheddon	Coal-mine inspector, district No. 1	Diamondville.
R. V. Hotchkiss	Coal-mine inspector, district No. 2	Sheridan.
G. B. Morgan	State geologist, geological survey of Wyoming	Cheyenne.

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BULLETIN 196. Coal-mine fatalities in the United States, 1919, and coal-mine statistics supplementing those published in Bulletin 115, with a list of permissible explosives, lamps, and motor tests prior to January 31, 1920, by A. H. Fay. 1920. 86 pp.

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Coal-mine fatalities in the United States during the calendar year 1915 with detailed figures for December, compiled by A. H. Fay. 80 pp., 3 figs. 10 cents.

Coal-mine fatalities in the United States during the calendar year 1916 with detailed figures for December, compiled by A. H. Fay. 1917. 42 pp. 5 cents.

Coal-mine fatalities in the United States, 1918, compiled by A. H. Fay. List of permissible explosives, lamps, and motors tested prior to January 31, 1919. 1919. 61 pp. 10 cents.

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